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PROCEEDINGS
OF THE
ZOOLOGICAL SOCIETY OF LONDON.

January 13, 1857.

Dr. Gray, F.R.S., in the Chair.

The following papers were read :—

1. NOTES ON THE BIRDS IN THE MUSEUM OF THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA, AND OTHER COLLECTIONS IN THE UNITED STATES OF AMERICA.

By PHILIP LUTLEY SCLATER, M.A., F.Z.S., ETC.

Having recently returned from a few months' excursion to the United States of America, and had the advantage of a personal inspection of the principal zoological collections in the northern portion of the New World, I think it may interest the Society to give them some account of the state of Ornithology in that country (that being the branch of Zoology to which I paid most attention), and to communicate some notes on new or rare specimens of Birds which thus came under my observation.

The collection of the Academy of Natural Sciences of Philadelphia is certainly the best zoological collection in the New World, and in the particular department of Ornithology, and perhaps one or two other points, is probably superior to every Museum in Europe, and therefore the most perfect in existence. In 1852, when Dr. Ruschenberger wrote his notice on the origin, progress, and condition of the Academy, the number of specimens of birds was estimated to exceed 27,000, and since that time large additions have been made, and the number has been very considerably increased. Dr. Thomas B. Wilson is, as is well known, the person to whose munificence the Academy is indebted for the greater part of the specimens which make up this magnificent series. The general collection formed by
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Prince Massena d'Essling, Duc de Rivoli, and the types of the species described by Mr. Gould in the 'Birds of Australia,' were the first and largest of Dr. Wilson's contributions towards this result; but a great number of further additions have been received during the last ten years from the same individual, and no opportunity is neglected of rendering this branch of the Academy's collection still more perfect. As the Library of the Academy is also very complete, particularly in all that relates to Ornithology, and the greatest liberality is shown to strangers who desire access to any part of the collections, it will be evident that there are few, if any, places in the globe where a student of Ornithology can pursue his researches with more convenience and profit to himself than the Academy of Natural Sciences of Philadelphia. Mr. John Cassin, so well known by his work on the Birds of California and Oregon, and his numerous papers in the Proceedings of the Academy, devotes the whole of his leisure time towards the cataloguing and arrangement of the collection of birds, and has already published Lists of the *Raptores*, and of the *Caprimulgidæ* and *Hirundinidæ* of the order *Passeres*. The collection of birds' eggs belonging to the Academy (of which Dr. Heerman published a catalogue in 1853) is likewise one of the most extensive in the world, embracing upwards of 1320 determined species.

Mr. Cassin has also a private collection of his own at Philadelphia, and is no less active in obtaining specimens in the field than in his studies of the examples contained in the Museum of the Academy.

At New York the Lyceum of Natural History have at present no collection, but publish, in their 'Annals,' many interesting papers on Ornithology, chiefly from the pen of Mr. George N. Lawrence. This gentleman is very well acquainted with the birds of the northern portion of the American continent, and possesses an extensive ornithological collection, embracing many species which he has himself described as new.

The types of the birds described by De Kay in the 'Natural History of the State of New York' are at Albany, and form part of the interesting collection which was the result of the State-survey, and so excellently illustrates the zoology of that region.

In Boston there is, as is well known, a flourishing Natural History Society, whose Museum contains a good collection of birds, principally American. Dr. Thomas Brewer, one of its members, has a very extensive cabinet of eggs, and is now about to publish, under the patronage of the Smithsonian Institution, a large work with coloured plates illustrating the eggs of all the species of North American birds—the first work of the kind undertaken in that country. Another member of the Society—Dr. Samuel Cabot—has also a collection of birds, containing, amongst others, the types of the species described by him in the Proceedings and Journal of the Society in 1843, and which he himself procured in Yucatan.

There are two collections of Natural History at Washington, which merit much attention. First, that in the Patent Office, where will

be found the specimens collected during the celebrated Exploring Expedition of Commander Wilkes, and some other of the Government expeditions: and, in the second place, the very extensive series of birds in the possession of the Smithsonian Institution, which body now takes in charge the specimens of Natural History collected by the more recent Government expeditions, as well as a large mass of material received from its own numerous correspondents. The United States Boundary Commission, and the six separate expeditions for the survey of the railway route to the Pacific, have lately accumulated a very large series of specimens of birds from the western portion of the continent in the hands of the Institution; and the publication of the Zoology of these expeditions (which Professor Baird, Mr. Cassin, and other Naturalists are now engaged upon) will make very large additions to our knowledge of North American Ornithology.

Professor Baird's private collection of birds is also very complete, and contains many of Audubon's rarer types.

The College of Charleston in South Carolina possesses an interesting collection of Natural History. The birds are principally North American, but there are several rare species from Cuba, presented to the College by Señor F. A. Sauvalle of Havana.

The following are some of the notes which I took during my inspection of the collections above mentioned, before presenting which I may be permitted to observe, that nothing can be more gratifying than the liberal access and great facilities in every case afforded to the stranger visiting the Collections and Libraries both public and private in the United States of America.

ACCIPITRES.

The American Vultures forming the genus *Cathartes* require further investigation before the number of the species can be satisfactorily determined. Most modern writers now agree in separating the southern red-headed and black-headed species from their northern representatives of the United States, *Cathartes aura* and *C. atratus*. Prince Bonaparte first remarked upon these differences in his paper on this subject in the Comptes Rendus for 1850, p. 292. But here, as also in his 'Conspectus,' he considers *C. burrovianus*, of Cassin, the same as the southern *C. iota*. This is, in my opinion, certainly not the case. There are two specimens of Mr. Cassin's bird in the Academy's collection from Mexico, and they most nearly resemble the true *aura* of the States, but are at once distinguishable by their diminutive size, and seem to be truly distinct from both the other two red-headed species.

Amongst the rarer types in the large series of Falconidæ possessed by the Academy, is the only hitherto known specimen of *Cymindis Wilsoni*, Cassin (Journ. Ac. Phil. i. p. 21. pl. 7). This singular bird is certainly quite different from *Cymindis uncinata*, with which Dr. Cabanis seems inclined to unite it (*vide* Journ. f. Orn. 1854, Extra-h. p. lxxx); and I have lately been informed that Dr. Gund-

lach, who is still prosecuting his researches into the rich ornithology of the island of Cuba, has recently succeeded in obtaining other specimens.

The little Californian *Athene* or *Glaucidium*, which Cassin has considered to be Temminck's *Strix infusata* (Birds of Cal. & Oreg. p. 189), and was called by Audubon *Strix passerinoides*, appears to be clearly different from the South American bird, which is legitimately entitled to bear both of these names. It seems most like the European *passerina*, but has the toes only partially covered with hairs. Unless Wagler's *Glaucidium gnoma* can be reconciled with it, of which there appears to be much doubt, it will require a new name; and I should therefore venture to suggest that it be called *Glaucidium californicum*.

The Library of the Philadelphian Academy contains a copy of the rare work called 'Registro trimestre,' published in Mexico in 1832, and of which some particulars are given by Mr. Cassin in his 'Birds of California' (p. 24). Señor De la Llave's generic appellation of *Pharomacrus* for the group of Trogons called *Calurus* by Mr. Gould, occurs here in an article entitled "*Sobre el Quetzaltototl, genero nuevo de aves*," and is decidedly entitled to adoption. As, however, De la Llave's specific name "*mocinno*" (intended to immortalize an illustrious Mexican of that name) is rather unpleasing, I trust that the term *paradiseus* may have been previously applied to it by Prince Bonaparte. The Prince assigns the date of 1826 to the publication of this name in his 'Conspectus,' but gives no reference, and I cannot find out where this name was first employed. In the second volume of the same work, Señor De la Llave describes four new Humming-Birds under the curious specific titles *xicotencal*, *tzacatl*, *papantzin* and *topiltzin*!!

Two specimens of the bird which I described in these Proceedings under the name of *Cyphorinus albigularis* are in the collection of the Philadelphian Academy. They were obtained at Panama by Mr. Bell. I found them marked, to my surprise, *Thryothorus fasciato-ventris*, Lafr. (R. Z. 1845, p. 337), and such is indeed the case. My specific name must therefore give place, and the species *Thryothorus fasciato-ventris* should be elided from the list of Bogota Birds, in which, on Lafresnaye's authority, I have hitherto included it. The same collection also contains an example of the beautiful *Vireolanus icterophrys*, Bp. (P. Z. S. 1855, pl. ciii.).

Besides the three little Thrushes (which have been so much confounded together, and have received so many names), called in Bonaparte's 'Conspectus,' *Turdus solitarius*, *T. minor* and *T. wilsoni*, Audubon's *Turdus nanus* appears to me to be also a valid species. It most nearly resembles *T. solitarius*, of which it is the western representative, but is smaller in size, and has a more densely spotted throat and breast. I cannot understand the reasons that have induced Prince Bonaparte to banish *Turdus naevius*, of which I saw many examples in the American collections, from the family of Thrushes, and to place it among the *Teniopterines*. I cannot at all agree with him on this point. Mr. Bell, who has observed this

bird in a state of nature, tells me that its habits are nearly those of the American Robin (*Turdus migratorius*), and I am inclined to consider that bird as its nearest ally.

The Philadelphian collection contains the only adult male I have seen of the beautiful Flycatcher named *Muscicapa rugensis* by Hombron and Jacquinot (Ann. d. Sc. Nat. xvi. p. 312). M. Pucheran, led away by the strong compressed beak, which is truly remarkable in this family, has placed this bird in the genus *Colluricincla*. But an attentive examination of its structure shows, without doubt, that it is a Muscapine, though with abnormal characters pushed to the extreme of divergence. I think, however, it may safely be placed in the neighbourhood of *Pomarea nigra*, with which it corresponds in its changes of plumage. Prince Bonaparte has proposed for it the separate generic name *Metabolus*.

The Smithsonian Institution possesses examples of *Pachyrhamphus aglaia* (v. P. Z. S. 1856, p. 297), collected by Mr. Couch in the province of New Leon, Mexico. This is the farthest northern appearance of a bird of this family hitherto recorded.

Mr. Lawrence of New York, amongst many other very interesting birds in his collection, showed me the first example I had seen of Audubon's *Alauda spraguii*. This has always been rather a puzzling bird to me, as the New World is commonly supposed to be devoid of true Larks—although one would have thought the immense grassy prairies of the Northern Continent to be a region perfectly adapted to the members of this group of animals—and their place is occupied by the modified Starling-like form *Sturnella*. Prince Bonaparte has located this curious bird in the genus *Otocorys*; Professor Baird has called it an *Agrodroma*. But an examination of the specimen which I now exhibit, and which has been kindly lent to me by Mr. Lawrence, at once shows that its true place is not in either of these genera. Though rather tenuirostral, it must, I think, be placed within the *Alaudidae* (and not with the Pipits) near *Calandrella* and *Otocorys*, with which forms it agrees in the absence of the first spurious quill, and I venture to propose for it the distinct generic title *Neocorys*.

Mr. John Bell of New York gave me a most interesting account of the discovery of this bird, which was made by Mr. Audubon's party on the Upper Missouri in the neighbourhood of Fort Union, at the junction of the Yellowstone and Missouri rivers. Here it is abundant, though not easy to obtain, being only noticeable when soaring high in the skies like our Sky-Lark, and pouring forth its long-continued song.

The Smithsonian Institution and Philadelphian Collection both contain examples of *Myiadestes Townsendi*, which I found, as I had anticipated, to be truly different from the bird which I characterized in these Proceedings last year under the name of *M. unicolor* (v. P. Z. S. 1856, p. 299), and still more so from Lafresnaye's *M. obscurus*, to which Prince Bonaparte and Cabanis have united it. Another species of this peculiar form, which I first saw in Mr. Lawrence's collection, is *M. elisabethæ* from Cuba (*Muscicapa elisabethæ*,

Lembeye, Av. de Cuba, pl. 5. fig. 3). These, with *M. armillata*, from Jamaica, *M. griseiventris* from Peru, and my *M. venezuelensis*, make a total of seven typical species of this singular group now known, and afford a beautiful example of the regular diffusion of corresponding ornithic species over distinct though neighbouring geographic areas. The Philadelphian Collection likewise contains an example of *Cichlopsis leucogonys*, Cab., belonging to the same family of birds, the type of which in the Berlin Museum has been hitherto considered as unique.

Among the Tanagers in the Philadelphian Academy I discovered two specimens of a very distinct species of *Saltator*, which I have never seen in European collections, and which I described in the Proceedings of the Academy under the name of *S. atripennis*. Dr. Cabot of Boston also showed me the type of his *Pyranga roseogularis*, which is apparently a good species. These two Tanagers must be added to those given in my Synopsis of the birds of that family published in these Proceedings last year.

On examining the type of Mr. Cassin's *Pastor nigrocinctus* (Pr. Ac. Sc. Phil. v. p. 68), I found it to be the same as the bird in the Paris Museum named *Sericulus anais* by Lesson, R. Z. 1839, p. 441, and which has rightly been raised to generic rank by Prince Bonaparte under the name *Melanopyrrhus anais* (Notes Orn. p. 9). The existence of a second example of this bird is very interesting, as it removes all doubts about its being a real and not a fictitious bird, as Mr. G. R. Gray hints in his 'List of Genera and Subgenera.'

The same collection is also fortunate in possessing amongst its complete series of *Paradiseidae*, the only known specimen of the splendid second species of the genus *Diphyllodes*. American Naturalists were quite unaware when they named this bird that Prince Bonaparte's characters of his *Lophorina* (!) *respublica* (Compt. Rend. 1850, p. 131) were taken from the self-same example. And seeing that even after the correction of the error in the generic appellation (Compt. Rend. 1850, p. 291), the descriptive phrase given by the Prince is positively erroneous, and such as the bird cannot by any possibility be recognized by, I must say I think it very questionable whether we ought not to employ Cassin's name *Wilsoni* for this species, although certainly subsequent in time of publication to Prince Bonaparte's term *respublica*.

The Philadelphian Collection also possesses the only known example of *Paradigalla carunculata*, described and figured by Eydoux and Souleyet in the 'Voyage of the Venus.'

Icterus Scottii, Couch, Pr. Ac. Sc. Phil. vii. p. 66, discovered by Lieut. Couch in New Leon and Coahuila, Mexico, is the same as *Icterus parisorum*, Bp.

There have been two species of this family long confounded under the name *dominicensis*. The true *I. dominicensis* (*Pendulinus flavigaster*, Vieill.) is from Cuba and S. Domingo, and is the bird characterized under the name *Pendulinus hypomelas* in Bp.'s Consp. p. 433. sp. 8. On the other hand, his *P. dominicensis* is quite a different bird, which I propose for the future to call

ICTERUS WAGLERI.

Psarocolius flavigaster, Wagl. Isis, 1829, p. 756, nec Vieill.

Pendulinus dominicensis, Bp. Consp. p. 432, nec Linn.

Nigro-sericeus: *tectricibus alarum minoribus infra et supra, dorso postico et abdomine toto flavis, hoc aurantiaco tincto*: *tectricibus caudæ inferioribus nigris*.

Long. tota 8·0, alæ 4·2, caudæ 3·7.

There are examples of this bird at the Smithsonian Institution collected by Lieut. Couch in Coahuila. I have likewise examples of it in my own collection. *Icterus prosthemelas*, Strickland (Contr. Orn. 1850, p. 120. pl. 52) (which is not the same as *Pendulinus lessoni*, Bp.), is a closely allied species, but is smaller and has the under tail-coverts yellow.

Emberiza belli, Cassin (Pr. Ac. Sc. Phil. 1850, pl. 4. p. 104), and *Emberiza bilineata* (ibid. pl. 3) seem to me to form natural members of the genus *Poospiza*, and I propose to call them *Poospiza belli* and *Poospiza bilineata*.

Junco cinereus has recently been described as new for the third time as *Struthus caniceps* (Woodhouse in Pr. Ac. Sc. Phil. vi. p. 202). As I have already observed, the name *Junco* ought to be employed instead of *Struthus* for all the three closely allied species of this genus, which will henceforth stand as *J. cinereus*, *J. oregonus*, and *J. hyemalis*.

Zonotrichia gambelli (the third species of Bp.'s Consp.) is now considered in America as the young of *Z. leucophrys*: *Z. mortoni* (the fifth species), of which I have seen the type in the Philadelphia collection, is nothing more than a Chilean specimen of *Z. pileata* sive *matutina*: *Z. querula* (the ninth species) is the same as (the tenth) *Z. comata*, and ought rather to be placed in the genus *Passerella*.

Struthus atrimentalis, Couch (Pr. Ac. Sc. Phil. vii. p. 68), seems to be the same as *Spinites atrigularis* (Cab. Mus. Hein. p. 133), though M. Cabanis' phrase is not very perfect.

The beautiful *Zonotrichia cassinii* lately described by Woodhouse (Pr. Ac. Sc. Phil. vi. p. 60) is very closely allied to *Peucaea bachmanni*, and must be placed next to it.

Dr. Gambel's *Fringilla blandingiana* (Journ. Ac. Phil. i. pl. 9) is the same as *Pipilo rufipileus*, Lafr. It is not an *Embernagra*, as arranged by Bonaparte, nor a *Pipilo*, and, as divisions are made now-a-days, ought probably to have a distinct generic appellation.

Chondestes ruficauda, Bp. Notes Orn. p. 18, of which I found several specimens in the collection at Philadelphia, is a typical *Aimophila*, and *Embernagra pyrgitoides*, Lafr., seems to be nothing more than *A. rufescens*, the second species of that same genus.

The Philadelphia Collection has likewise specimens of *Chrysomitris yarrelli* (Aud.), not however from Western America, but from the Orinoco; and I believe Audubon was altogether in error as to its locality, and that it is an inhabitant, not of the northern, but of the southern portion of the American continent.

The recent researches have increased the number of Woodpeckers of the genus *Centurus* occurring within the limits of the United States to three in number:—(1) *C. carolinus*, of the Eastern States; (2) *C. uropygialis*, Baird, lately discovered by the Naturalists attached to Lieut. Whipple's expedition in New Mexico; and (3) *C. flaviventris*, Sw., which seems to be by no means uncommon in Texas, and is apparently quite distinct from *C. santacruzi*, Bp., with which it is often considered synonymous.

There is a very fine series of specimens of the genus *Coua* in the Philadelphian collection representing every species mentioned in Prince Bonaparte's 'Conspectus,' except *C. madagascariensis*. *Coua ruficeps* is by no means the same as *C. reynaudi*, as is there made out, but is a species more like *C. cristata* with a white throat and violaceous breast from Zanzibar, while *C. reynaudi* is from Madagascar.

Certain European Naturalists appear to me to have been much too hasty in condemning the new *Grus hoyiana* lately described by Mr. Dudley in the 'Proceedings of the Philadelphian Academy.' Judging from the examples in the collection of that Institution, I venture to pronounce it an excellent species, and not the young of *Grus americana*, as Dr. Hartlaub has endeavoured to prove (Journ. f. Orn. 1855, p. 336). It would seem, however, that this bird is really a Western species from Oregon and Washington territory, and only accidentally present in Wisconsin, where it was first met with by Mr. Dudley.

2. ON THE STRUCTURE OF THE PELVIS OF CHLAMYPHORUS TRUNCATUS. BY DR. J. E. GRAY, F.R.S., V.P. ENT. SOC., ETC.

Sir Woodbine Parish having, after considerable trouble, at length been able to procure a second specimen of this extraordinary and most interesting animal, has kindly transmitted it to the British Museum.

The specimen had been eviscerated and simply dried in the sun, was destitute of any fur, and did not afford any means of distinguishing its sex.

The Museum already possessed the well-preserved specimen formerly procured by Sir Woodbine Parish, and the imperfect skeleton of it so well described and figured by my late excellent friend Mr. Yarrell in the Zoological Journal, vol. iii. p. 544. t. 16.

In the specimen of the skeleton figured and described by Mr. Yarrell, the bones of the pelvis were separated to preserve the outer covering entire; the "bones being cut through as near to and as parallel with the inner surface of the plates as their confined situation would admit," p. 546.

This description did not in the least prepare me for the extraordinary structure which was discovered when the flesh was removed.

The truncated posterior disk or shield is firmly attached to the

pelvis by four (or two pairs of) posterior processes, and in the central line by the elongated ridges of the posterior sacral vertebra, so as to be immoveably fixed to the pelvis. The posterior disk is thick, rather

Fig. 1.



Fig. 2.

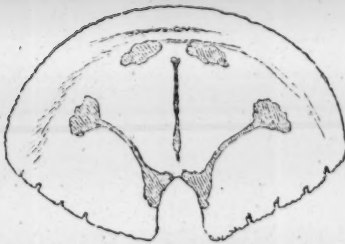


Fig. 3.

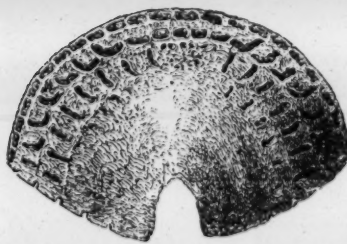


Fig. 1. Side view of the pelvis, with the inside of the attached posterior disk.

Fig. 2. The inside of the posterior disk, showing the position of the places of attachment.

Fig. 3. The outer side of the posterior disk, showing the form and position of the perforations.

solid, and furnished with a marginal series of oblong perforations, having a second series of similar but smaller perforations within them in the centre, and two series of much elongated curved slits on each side, near the margin, as in the figure.

Professor Owen informs me that a somewhat similar adhesion of the skeleton to the dermal system is to be observed in the *Glyptodon*, and also in some of the fossil Armadilloes of the older strata.

3. ON THE PRESENCE OR ABSENCE OF AIR IN THE BONES OF BIRDS. BY EDWARDS CRISP, M.D.

As one of the objects of the founders of this Society, as expressed by the Charter, was the cultivation of Physiology, and as our communications of late, upon this subject, have been rather scanty, I am induced to submit this paper to the notice of the members, and I do so with a hope that it may serve to dispel one of the many errors that unfortunately encumber the science of Zoology.

My attention was first especially directed to the investigation of

this matter in consequence of hearing the following statement by Professor Owen, in one of his Lectures at the College of Surgeons, on the *Vertebrata*, of which I took notes at the time. The lecturer, to show the permeability of the bones of birds to air, said, "that a friend of his saw a man driving sea-gulls near Boulogne, and being surprised that the birds did not fly, he inquired the reason, and was told by the man that their thigh-bones had been perforated to let out the air;" and in further corroboration of this, Professor Owen said, "every sportsman knows that when the legs of a partridge are broken, it falls from the same cause."

I knew that this latter statement was an error, for two reasons—first, because a partridge does not fall when its legs are broken; and, secondly, and especially, because the thigh-bones of this bird do not contain air. In my dissections of the gulls I had not examined the thigh-bones; but to my surprise on investigating this matter, I found in all specimens afterwards dissected, that neither the *humeri* nor the *femora* contained air, but were filled with marrow. I next began to ask myself whether the presence of air in the femora of most birds would not act as an impediment to their flight, by diminishing the strength of the bone, and more particularly by depriving them of that weight and ballast which might be essential to their aerial progress? I knew, moreover, that most of our bats (the bones of which are free from air) could keep on the wing for many hours, some of them carrying their young, whilst probably the sparrow, robin, wren, partridge, and many other birds, could not sustain a continuous flight for five minutes. I next discovered that in many specimens of the common fowl, a bird that had scarcely ever topped a brick wall, the humerus was hollow; but in other birds of long flight that I examined at the same time, including the snipe, curlew, and many birds of passage, that none of the bones of the extremities contained air. Before proceeding further with the investigation, I consulted several modern writers upon the subject, and I subjoin extracts from their works for the purpose of showing the prevailing opinion upon the matter. It was not till this morning, after the above was written, that I consulted the essays of Camper and Hunter, and it will perhaps be more methodical to quote these anatomists before the others.

The first writer I find upon the subject is Camper, '*Œuvres d'Anatomie Comparée*,' Paris, 1803, vol. iii. p. 460. The paper was presented to the Haarlem Academy, and he calls the discovery one entirely new, "that nearly all the bones of birds are filled with air by respiration;" he entitled it a discovery, because he knew of no author who had indicated the same thing. Marsighni had spoken of the wing-bones of the pelican as very light and hollow, but he did not allude to air, nor the manner in which it entered the cavity. The first observations (February 1771) were made on the sea-eagle, owl, maccaw, turkey, black-cock, and common fowl. The *humeri* and *femora* were perforated, and the air-sacs and lungs inflated through the apertures. He came to the conclusion (verified by finding that the thigh- and wing-bones of a sparrow contained marrow) that all high-flying birds had the bones of the extremities filled with air;

and he thought it probable that the wing-bones only of the swans, geese and ducks would be found to be hollow. -

After John Hunter's paper in the sixty-fourth volume of the London Philosophical Transactions, 1774; being "An Account of certain receptacles of air in birds, which communicate with the lungs and are lodged among the fleshy parts and in the hollow bones of these animals," Camper published a letter (vol. iii. p. 474) claiming the discovery three years before Hunter had spoken of it.

Hunter, in the paper above mentioned, appears to have confined his observations to a few birds, and his three quoted experiments for the purpose of showing that a bird may breathe through apertures made in the *humerus* or air-sacs, are very inconclusive. The birds he speaks of are the ostrich, the common fowl, the woodcock, pelican and canary. The chief object of the paper was to show that the air-sacs and bones are appendages to the lungs. The essays of these great anatomists, of which I have given a brief outline, will well repay perusal; and if many subsequent writers upon the subject had depended upon their own observations, the prevailing error "*that the bones of a bird are filled with air,*" would not have occurred.

In Cuvier's 'Animal Kingdom' is the following:—"The air-cavities which occupy the interior of their body, and even (usually) supersede the marrow in their bones, increase their specific lightness."

Milne-Edwards, in his 'Elémens de Zoologie,' p. 504, says, "In general, air is found in great abundance in the bones of the members most employed in locomotion. In the ostrich, for example, the air-cells in the femur have a remarkable development."

The late Mr. Yarrell, whose recent death we all so much deplore, does not in his work on British Birds speak of the bones; but in his 'British Fishes' (Introduction, p. 21), he says, in alluding to the air-bladder, "The analogy to the air-cells in birds, and the passage of air from thence into the bones of the limbs, is too obvious to be unobserved, and will give interest to further investigation." So that Mr. Yarrell's impression evidently was, that the limb-bones of birds were supplied with air.

Mr. Rymer Jones, in his 'Organization of the Animal Kingdom,' 1855, p. 75, says, "Birds, in fact, breathe not only with their lungs, but the vital element penetrates almost every part of the interior of their bodies, bathing the surfaces of their viscera, and entering the very cavities of their bones; so that the blood is most extensively subjected to its influence."

In Carpenter's 'Comparative Physiology,' 1854, it is said, that "Even the bones are made subservient to this function (respiration); for though at an early period they possess a spongy structure, like those of reptiles, and are filled with thin marrow, they subsequently become hollow, and their cavities communicate with the lungs. In the aquatic species, however, the original condition is retained through life." And in his 'Manual for the Use of Students,' p. 386, it is stated, that in most birds the bones are hollow.

Professor Owen, in his article "Aves" in the 'Cyclopædia of Anatomy and Physiology' (vol. i. p. 343), remarks, "The singular

extension of the respiratory into the osseous system was discovered simultaneously by Hunter and Camper, and ably investigated by them through the whole class of birds. It is stated that if the femur into which the air is admitted be broken, the bird shall not be able to raise itself in flight." He then quotes from Hunter's experiments before alluded to.

Professor Owen goes on to say, that "the proportion in which the skeleton is permeated by air varies in different birds. In the penguins he found no air in the bones. The struthious birds have all air admitted into the cavities, except the *humeri*, *tibiae* and distal bones of the legs, which retain their marrow. With the exception of the woodcock, all birds of flight have air admitted into the *humerus*. The pigeons, with the exception of the crown pigeon, have no air in the femur, which retains its marrow. In the owls also the femur is filled with marrow, but in the diurnal birds of prey, as in almost all other birds of flight, the femur is filled with air. In the pelican and gannet the air enters all the bones with the exception of the phalanges of the toes. In the hornbill even these are permeated by air."

In his 'Lectures on Comparative Anatomy,' vol. ii. p. 34, nearly the same opinion is expressed, and the swifts and humming-birds are said "to have air in every bone of the skeleton down to the phalanges of the claws."

I make no apology for these quotations, because they are essential for the proper understanding of the matter.

I have placed on the table a French and English partridge, a lark, a snipe, a sparrow, a starling, and the skeleton (in maceration) of a swift (*Cypselus apus*), and it will be seen that in the three first-named birds only do the *humeri* contain air; the other bones are filled with marrow; in the remaining four birds the bones contain no air: but I should observe that in two swifts before examined I found the *humeri* hollow, the other bones full of marrow. I also exhibit the bones of many birds that I have dissected; among these are the ostrich, jabiru, eagle, sparrow-hawk, Weka-rail, green woodpecker, and many of the *femora* and *humeri* of the smaller British birds, nearly all of which are filled with marrow; indeed there are no apertures in the bones for the admission of air.

To bring the question to a more practical bearing, I subjoin a list of birds recently dissected (most of them shot by myself), in which I have examined the bones of the extremities to ascertain the presence or absence of air, and in this communication I think it better to include only British birds.

Sparrow Hawk. *F. nisus*.

Magpie. *C. pica*.

Jackdaw. *C. monedula*.

Woodpigeon. *C. palumbus*.

Turtle Dove. *C. turtur*.

Sky Lark. *A. arvensis*.

Green Woodpecker. *P. viridis*.

Common Duck.

Velvet Scouter. *O. fusca*.

Common Fowl.

Turkey.

Partridge (English). *P. cinerea*.

Partridge (French). *P. rufa*.

Bittern. *B. stellaris*.

Common Gull. <i>L. canus.</i>	Swallow. <i>H. rustica.</i>
Black-headed Gull. <i>L. ridibundus.</i>	Sand Martin. <i>H. riparia.</i>
Herring Gull. <i>L. argentatus.</i>	Goat-sucker. <i>C. Europæus.</i>
Great Black-backed Gull. <i>L. marinus.</i>	Chaffinch. <i>F. cælebs.</i>
Razor Bill. <i>A. Torda.</i>	Yellow-hammer. <i>E. citrinella.</i>
Puffin. <i>F. arctica.</i>	Sparrow. <i>F. domestica.</i>
Red-throated Diver. <i>C. septentrionalis.</i>	Wheat-ear. <i>S. ænanthe.</i>
Moor Hen. <i>G. chloropus.</i>	Wren, Common. <i>T. Europæus.</i>
Coot. <i>F. atra.</i>	Wren, Crested. <i>R. auricapillus.</i>
Curlew. <i>N. arquata.</i>	Robin. <i>S. rubicula.</i>
Godwit. <i>L. melanura.</i>	Blackbird. <i>T. merula.</i>
Dotterel. <i>C. morinellus.</i>	Thrush. <i>T. musicus.</i>
Common Snipe. <i>S. gallinago.</i>	Fieldfare. <i>T. pilaris.</i>
Jack Snipe. <i>S. gallinula.</i>	Red-wing. <i>T. iliacus.</i>
Sanderling. <i>A. vulgaris.</i>	Missel Thrush. <i>E. viscivorus.</i>
Water Ousel. <i>C. aquaticus.</i>	Starling. <i>S. vulgaris.</i>
Swift, Common. <i>H. apus.</i>	Hedge Sparrow. <i>A. modularis.</i>
House Martin. <i>H. urbica.</i>	Little Creeper. <i>C. familiaris.</i>
	Wood Lark. <i>A. arborea.</i>
	Oyster-catcher. <i>H. ostralegus.</i>

I have mislaid the notes of my dissections of many other British birds, and as I do not like to trust to memory, I will reserve these for the concluding part of my paper.

Of the above fifty-two birds, the first only had many of the bones permeated with air; the next thirteen on the list had the *humeri* only hollow, and among these it will be observed that there are many of short flight. Of the remaining thirty-eight none of them had marrow in the *femora* or *humeri*, and judging from a few that were examined (the snipe, *e. g.*), none of the bones contained air. The last list includes some birds, as the swift, martin and swallow, that are longer on the wing and probably of swifter flight than any of the feathered creation.

By way of testing more accurately the correctness of my conclusions, I performed the following experiments:—I introduced a blow-pipe into the trachea of a common duck, a cock, a French partridge, an English partridge, and a snipe; I opened the *humeri* and *femora* of all, and placed the dead birds under water; I then inflated the lungs and air-cells in the chest and abdomen, the size of the birds being greatly increased by the inflation. In the cock the air escaped freely from the aperture in the *humerus*; but in the other birds no air was present. I then removed the *humerus* and *femur* at the upper joint, but still no air escaped on inflation. As I have stated before, all these birds, with the exception of the snipe, had hollow *humeri*, but none of them had air in the thigh-bones; these experiments, however, require repetition on a larger scale.

In my next paper I purpose describing the air-sacs in the thoracic and abdominal cavities of birds; the method by which air is admitted to the hollow bones; and the flight of birds in relation to these matters.

January 27, 1857.

Dr. Gray, F.R.S., in the Chair.

The following papers were read :—

1. DESCRIPTIONS OF THREE NEW SPECIES OF THE GENUS
PHAËTHORNIS, FAMILY TROCHILIDÆ.
By JOHN GOULD, F.R.S., ETC.

PHAËTHORNIS VIRIDICAUDATA.

Stripe over and behind the eye light buff; crown of the head, upper surface and wing-coverts bronzy grass-green, duller on the head; wings purplish brown; tail-feathers bronzy grass-green at the base, passing into dark brown towards the extremity, the central feathers tipped with white; the next margined on each side at the tip with white, and the remainder with white on the apical portion of the external web; under surface reddish buff, becoming paler on the abdomen and vent; upper mandible black; basal two-thirds of the lower mandible yellow; tip black; legs yellow.

Total length, $3\frac{3}{4}$ inches; bill, 1; wing, $1\frac{1}{2}$; tail, $1\frac{5}{8}$.

Hab. Rio de Janeiro.

Remark.—This species belongs to that section of the *Phaëthornithes* to which Prince Charles L. Bonaparte has given the generic appellation of *Pygmornis*, or, in other words, which is allied to the *P. eremita*, *pygmæus* and *griseogularis*; but differs from all in the absence of any red on the rump, and in the green colouring of the base of the tail.

PHAËTHORNIS EPISCOPUS.

Head, upper surface and wing-coverts rich golden brown; behind the eye a stripe of buff; wings purplish brown; tail deep bronzy brown at the base, changing into slaty brown near the apex, and slightly tipped with grey; rump rufous; ear-coverts black; under surface deep sandy buff, crossed on the breast by a broad band of jet-black; somewhat elongated plumes; upper mandible and apical third of the lower mandible black; basal two-thirds of the latter yellow.

Total length, $3\frac{1}{2}$ inches; bill, $\frac{7}{8}$; wing, $1\frac{1}{8}$; tail, $1\frac{1}{3}$.

Hab. Demerara.

Remark.—This species differs from both *P. pygmæus* of Spix and *P. eremita* in the rich bronzy colouring of its upper surface, by the greater breadth of the black pectoral band, the deep bronzy hue of the tail, and by the small size of its short and rounded wings.

PHAËTHORNIS OBSCURA.

Head, upper surface, and wing-coverts dark bronzy green; stripe behind the eye buff; wings purplish brown; tail dark bronzy brown, each feather narrowly margined externally and slightly tipped with white; throat smoky black, between which and the eye a stripe of

light buff; chest clouded chestnut, passing into dark grey on the abdomen, and fading into buffy white on the vent; under tail-coverts greyish white; upper mandible and tip of the lower black; basal three-fourths of the latter yellow.

Total length, $3\frac{5}{8}$ inches; bill, $\frac{7}{8}$; wing, $1\frac{3}{8}$; tail, $1\frac{1}{2}$.

Hab. Rio de Janeiro.

Remark.—This is also one of the smaller species of the former, which, like *P. viridicaudata*, would pertain to Prince C. L. Bonaparte's genus *Pygmornis*. It differs from all others yet known in its darkly coloured throat and under surface.

2. FURTHER ADDITIONS TO THE LIST OF BIRDS RECEIVED IN COLLECTIONS FROM BOGOTA. BY PHILIP LUTLEY SCLATER, M.A., F.L.S.

Since the last communication which I made to this Society on Birds received in collections from Bogota, I have obtained specimens and information from several quarters, which have enabled me to draw up the following supplementary list of fifty-two species not mentioned in my previous papers on this subject. This increase raises the total number of birds now known as belonging to the ornithology of the interior of New Grenada to upwards of 510. That future researches will develop still farther additions, and among them many new species, I have no doubt. For there are still considerable vacancies in the series to be filled up, particularly in the *Accipitres*, *Grallæ*, *Gallinæ*, and *Anseres*, and among the more obscure groups of *Passeres* (such as the *Tyrannines*), which I have as yet hardly ventured to touch, that is, in the way of naming new species, on account of the confusion which at present prevails among those already described.

When last in Paris, I had the pleasure of examining the large series of *Trochilidæ* belonging to M. Parzudaki. From the information I thus obtained, and from the kind assistance rendered to me by Mr. Gould, I have been enabled to enumerate twenty species of that family, omitted in my former lists, which occur in the interior of New Grenada. These added to the forty-nine previously given, make up a total of about seventy birds of this group which may be considered inhabitants of this region.

M. Jules Verreaux of Paris has supplied me with numerous notes made on the birds which have come under his notice from Bogota collections since the publication of my first list.

Mr. George N. Lawrence, the well-known Ornithologist of New York, showed me a considerable collection of Bogota skins, when I was in that city during the past autumn. Out of these birds received direct from Bogota he most liberally allowed me to bring to this country, for the purpose of closer examination, such as I was not able to identify on the spot, and I have found among them several species of which I have not elsewhere seen specimens from that region.

1. *IBYCTER AMERICANUS* (Bodd.), Strickl. Orn. Syn. i. p. 22.
In Mr. Lawrence's collection from Bogota.
2. *SYRNIUM ALBITARSE*, G. R. Gray, in Mus. Brit.
I have lately acquired a Bogota skin of this species, which agrees perfectly with the type in the British Museum. It is very nearly allied to *Syrnium hylophilum*, and I think it quite possible that what is supposed to be that bird from Bogota in the Philadelphian collection may really be referable to this species. Dr. Kaup has united it to *S. hylophilum* in the 'Monograph of Strigidæ' in Jardine's Contributions for 1852, but, I think, incorrectly. There has, I believe, been no description published of this bird.
3. *BRACHYGALBA INORNATA*, Sclater, P. Z. S. 1855, p. 15.
I have lately obtained a Bogota specimen of this bird.
4. *TROGON VIRIDIS*, Linn.
A Bogota skin in Mr. Lawrence's collection seems identical with Brazilian examples.
5. *CAMPYLOPTERUS LAZULUS* (Vieill.), Bp. Consp. p. 71.
6. *BOURCIERIA TORQUATA* (Boiss.), R. Z. 1840, p. 6.
7. *BOURCIERIA PRUNELLII* (Bourc.), R. Z. 1843, p. 70.
Obtained by M. Bourcier from the environs of Facativita in the province of Bogota.
8. *LAMPORNIS MANGO* (Linn.).
The Bogota bird seems to be the true *L. mango*.
9. *THALURANIA VIRIDIPECTUS*, Gould, P. Z. S. 1848, p. 13.
10. *HELIODOXA LEADBEATERI* (Bourc.), R. Z. 1843, p. 102.
11. *HELIOMASTER LONGIROSTRIS* (Vieill.), Gould, Mon. Trochil. v. pl. 9.
This species has a considerable range, occurring also in Trinidad, Demerara, Cayenne, and Venezuela.
12. *AMAZILIUS REIFFERI* (Bourc.), R. Z. 1843, p. 103.
Discovered by M. Reiffer at Fusugagua in the New Grenadian Andes, south of Bogota.
13. *AMAZILIUS CASTANEIVENTRIS*, Gould, P. Z. S. 1856, p. 150.
14. *SAUCEROTTIA VIRIDIGASTRA* (Bourc.), R. Z. 1843, p. 103.
Discovered by M. Reiffer at Fusugagua.

15. SAUCEROTTIA CYANEIFRONS (Bourc.), R. Z. 1843, p. 100.

The locality given for this species by M. Bourcier is Ibagué, which is the capital of the province of Mariquita, on the left bank of the Magdalena. It frequently occurs in Bogota collections.

16. HYLOCHARIS GOUDOTI (Bourc.), R. Z. 1843, p. 100.

Also from Ibagué.

17. HYLOCHARIS CHRYSOGASTER (Bourc.), R. Z. 1843, p. 101.
Occurs in Bogota collections.

18. AGLÆACTIS CUPREIPENNIS (Bourc.), R. Z. 1843, p. 71.

19. THAUMANTIAS MILLERI (Bourc.), P. Z. S. 1847, p. 43.

20. MYIABELLIA GUIMETI (Bourc.), R. Z. 1843, p. 72.

21. JULIAMYIA TYPICA, Bp.—*Ornismyia julie*!, Bourc. R. Z. 1842, p. 373.

Hab. Tunja in New Grenada, north of Bogota.

22. JULIAMYIA AMABILIS (Gould), P. Z. S. 1851, p. 115.

23. AVOCETTINUS EURYPTERUS (Lodd.), P. Z. S. 1832, p. 7.

24. LOPHORNIS DELATRII (Less.), R. Z. 1839, p. 19.

25. ANABATES STRIATICOLLIS, sp. nov.

Olivascenti-brunneus, capite virescentiore et hujus plumis tenuissime nigro marginatis: alis nigricantibus, extus brunneo, intus autem cinnamomeo marginatis: subtus clarior et cinnamomeo tinctus; gutture et pectore antico pallidioribus et scapis plumarum cum harum parte mediali clare flavicanti-albidis, strias obsoletas formantibus: cauda unicolore rufa: rostro flavido, culmine brunnescente, pedibus nigricantibus.

Long. tota 6·0, alæ 3·3, caudæ 2·6.

I have lately obtained a Bogota skin of this *Anabates*. Another specimen, which was previously in my collection and has been submitted to M. de Lafresnaye's examination, is marked in his handwriting "*Anabates striaticollis*, Lafr." I have therefore used that name, though as yet, I believe, unpublished. These two examples merely differ in their slightly inferior size from a third specimen marked "*Anabates olivaceiventer*" by M. de Lafresnaye some years since. I do not know whether he considers the two species indicated by these MS. names as distinct. For myself I doubt the fact. The cervical striæ, whence the name is derived, are not very well marked in my Bogota specimens.

26. SCLERURUS BRUNNEUS, sp. nov.

S. supra brunneus cinnamomeo tinctus, subtus paulo pallidior;
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guttur albo mixto : alarum et caudæ pennis intus nigricantibus, illarum marginibus externis dorso concoloribus : rostro nigro, basi flavicante : pedibus nigris.

Long. tota 6·0, alæ 3·4, caudæ 2·1.

I have lately obtained a single Bogota skin of a bird of this genus, to which (as I cannot associate it with any of the already-described species) I have given a new name. From *S. caudacutus* of Brazil and *S. mexicanus* (P. Z. S. 1856, p. 290) of Mexico and Guatemala, it differs in the want of the bright rufous colouring in the rump and fore neck. In this respect it would seem to resemble Hartlaub's *S. guatemalensis* (Rev. Zool. 1844, p. 370), but that bird is said to be of the size of *S. caudacutus*, to which the present species is considerably inferior in dimensions.

27. RHIMAMPHUS CÆRULEUS (Wils.), Am. Orn. pl. 15. fig. 7.

I have lately acquired two Bogota specimens of this in imperfect plumage.

28. GRALLARIA MONTICOLA, Lafr. R. Z. 1847, p. 68 ; Des Murs, Icon. Orn. pl. 53.

29. HYPOCNEMIS PÆCILINOTA, Cab. ; Bp. Consp. p. 202.

In Mr. Lawrence's Bogota collection.

30. TITYRA INQUISITRIX (Licht.), Bp. Consp. p. 180.

M. Parzudaki's collection contains an immature male of this species from Bogota.

31. PACHYRHAMPHUS PECTORALIS, Sw. An. in Men. p. 288.

A single skin from Bogota in my collection agrees with the Cayenne bird.

32. PACHYRHAMPHUS GRISEUS (Bodd.), Pl. Enl. 687. f. 1.

I have seen several Bogota skins of this bird. I likewise possess examples from S. Martha, Trinidad, and Cayenne.

33. CEPHALOPTERUS ORNATUS, Geoffr.

Mr. Lawrence has a fine example of this bird in his Bogota collection.

34. CYANOCORAX TURCOSUS, Bp. Compt. Rend. Ac. Sc. Par. (1854).

I have a Bogota skin of this species received from MM. Verreaux. It is very closely allied to the better-known *C. armillatus*, but may be distinguished by its rather larger size, the more greenish tinge of the plumage, and brighter blue of the throat.

35. CHRYSOMUS ICTEROCEPHALUS (Linn.), Pl. Enl. 343.

Mus. P. L. S. ex Bogota.

36. *PENDULINUS CHRYSOCEPHALUS* (Linn.), Bp. Consp. p. 432.

A single skin of this bird in M. Parzudaki's collection seems to agree with examples from Cayenne.

37. *LEISTES GUIANENSIS* (Linn.), Pl. Enl. 236. fig. 2.

Mus. Paris et P. Z. S. ex Bogota.

38. *SALTATOR OLIVASCENS*, Cab. P. Z. S. 1856, p. 71.

Mr. Cassin of Philadelphia presented me with the only Bogota example of this bird, which has yet come under my notice.

39. *RAMPHOCELUS UNICOLOR*, Sclater, P. Z. S. 1856, p. 128.

40. *EUPHONIA CRASSIROSTRIS*, Sclater, P. Z. S. 1856, p. 277.

41. *CAICA MELANOCEPHALA* (Linn.).

42. *PIONUS MENSTRUUS* (Linn.).

I possess Bogota skins of both of these Parrots. Of the latter I have also examples from S. Martha (Verreaux), and Barra do Rio Negro (Wallace).

43. *UROCHOMA HUETI* (Temm.).—*Psittacus hueti*, Temm. Pl. Col. 491.

Several specimens of this beautiful Parrot have lately been received in Paris from Bogota.

44. *OPISTHOCOMUS CRISTATUS*, Vieill.

In Mr. Lawrence's collection from Bogota.

45. *CRAX ALECTOR*, Linn.

In Mr. Lawrence's collection from Bogota.

46. *CHLORÆNAS RUFINA* (Temm.), Bp. Consp. ii. p. 54.

47. *CHAMAPELIA RUFIPENNIS*, Bp. Consp. ii. p. 79.

48. *GEOTRYGON MONTANA* (Linn.), Bp. Consp. ii. p. 72.

Bogota specimens of these three Pigeons are in Mr. Lawrence's collection.

49. *ORTALIDA MONTAGNII*, Bp. Compt. Rend. 1856 (May) xlii. p. 875.

MM. Verreaux have received this bird from Bogota.

50. *ABURRIA CARUNCULATA*, Bp.—*Penelope aburri*, Less. Tr. d'Orn. p. 482.

Discovered by M. Goudot near Bogota.

51. *TINAMUS CANUS*, Wagl. Isis, 1829, p. 746.

In Mr. Lawrence's collection from Bogota.

52. *PARRA HYPOMELÆNA*, G. R. Gray, Gen. Birds, pl. 159; P. Z. S. 1856, p. 283.

3. ON THE TRUE NAUTILUS UMBILICATUS OF LISTER. By AUGUSTUS A. GOULD, M.D.

In looking over the shells of a dealer in Boston (U. S. A.), I observed three specimens of an umbilicated Nautilus, which struck me as differing essentially from the shell commonly known as *Nautilus umbilicatus*. A more careful examination satisfied me that they were quite distinct; and I made out a comparative description of them, intending to designate the newly observed one by the name *texturatus*, on account of its finely reticulated surface. But on referring to the several figures of *N. umbilicatus*, I found that the figure of Lister, which represents the shell originally named *umbilicatus*, presented all the characteristics of the reticulated shell, while all other figures represented the smooth, shining shell ordinarily bearing that name. From both the figures and descriptions of authors, I am led to believe that the shell originally observed by Lister has not been recognized by conchologists since his day. Every writer except Favanne expressly speaks of his shell as smooth (*lævis*, *glatte*), and his figure clearly refers to the common shell. On the supposition, then, that these are two distinct species, it is proper to restrict the term applied by Lister to the shell represented by him, and to substitute another for the shell ordinarily named *umbilicatus*. The term *scrobiculatus* indicated in manuscript by Solander, and adopted by Dillwyn, and which has been placed by others as a synonym, may be appropriately restored to this species.

The principal differences between the two shells are as follow. Taking the common shell, so well represented in Sowerby's 'The-saurus' as a standard, the other shell, which we take to be the genuine *umbilicatus* of Lister, is more ventricose, the sides being nearly parallel, and the periphery broadly rounded; the aperture is nearly quadrate rather than oval, the posterior angles being nearly right angles; the umbilicus is rather larger, its walls nearly perpendicular, in no degree cup-shaped; its marginal angle very slightly rounded, the edges of each whorl broadly spreading over the preceding whorl, and it is in all cases clearly pervious; the surface, instead of appearing smooth and shining, with only some distinct traces of revolving striae near the aperture, has a dead, unpolished aspect, and is everywhere conspicuously reticulated with numerous, crowded, well-impressed, revolving lines; the colouring, instead of a lively ochreous, has a dusky smoky hue, and the chestnut-coloured flammules are numerous and delicate, numbering as many as five to the

inch in place of three in the *scrobiculatus*. In all the specimens of the latter which have come under my observation, the sides are conspicuously undulated by a series of distinct waves, in the direction of the lines of growth, which are wholly wanting in *umbilicatus*. The most obvious distinctive marks then are, in the former, the shining surface and waved sides; and in the latter, the numerous small flammules, dead surface, and well-marked revolving striae. These revolving striae are plainly indicated on the figure of Lister; and that they are not merely a style of the engraver's art, but are intended to indicate something in nature, may be inferred by comparing the figure with that of *N. Pompilius*, in immediate proximity, the surface of which is really like that of *scrobiculatus*. The best of the three specimens examined by me, is now in the possession of Hugh Cuming, Esq., and an inspection of it will fully confirm the above views.

The synonymy of the two species will then be as follows:—

N. UMBILICATUS. *Testa suborbicularis, ventricosa, striis confertis volventibus insculpta, utrinque late umbilicata; marginibus umbilicorum vix rotundatis; umbilico pervio, infundibuliformi, nigro margine externo vix rotundato; rufescens, postice radiatim ferrugineo strigata, strigis angustis, confertis.*

N. umbilicatus, Lister, Conch. t. 552. f. 4.

N. SCROBICULATUS. *Testa suborbicularis, subdepressa, laevis, nitida, lateribus radiatim fluctuatis, utrinque late umbilicata, umbilico crateriformi, margine externo rotundato, late flavescens, postice radiatim ferrugineo strigata, strigis latis, remotis.*

N. scrobiculatus, Soland. MS. Portland Catal. 169. no. 3653; Dillwyn, Catal. i. 339.

N. Pompilius, var. β ., Gmelin, no. 3369.

N. crassus umbilicatus, Chemn. Conch. x. t. 137. f. 1274, 1275.

Le grand Nautilé ombiliqué, Favanne, Conch. i. 726. t. 7. f. B 3, t. 69. f. D 2.

N. umbilicatus, Knorr, Vergn. iv. pl. 22. f. 4; Lamarck, Anim. s. Vert. xi. 322; Blainville, Malac. pl. 8. f. 2; Crouch, Conch. pl. 20. f. 16; Sowerby, Thes. Conch. pl. 98. f. 7.

February 10, 1857.

J. Gould, Esq., F.R.S., V.P., in the Chair.

The following paper was read :—

ON THE ANATOMY OF THE GREAT ANTEATER (*MYRMECOPHAGA JUBATA*, LINN.). PART II. BY PROFESSOR OWEN, F.R.S., F.Z.S., ETC.*

In my former communication on the Anatomy of the Great Anteater, the position of the stomach and its relations to adjoining viscera were briefly pointed out. In the present paper I propose to describe the form and structure of this very remarkable organ in the *Myrmecophaga jubata*.

Moderately distended the stomach presents a subglobular form, of about 8 inches diameter, with a smaller subglobular appendage, as it seems, of about 3 inches diameter, intervening between the main cavity and the intestine.

The œsophagus terminates near the middle of the upper surface of the main portion, of which about 4 inches extends to the left of the cardiac orifice to form what Haller called the 'saccus cæcus.' The general configuration of the stomach, as seen from the anterior surface, will be shown in the first Plate.

On the middle of both the anterior and posterior surfaces of the stomach is a sheet of tendon, of an irregular triangular form, 6 inches in longest diameter, which is in the direction of the length of the stomach, and in which the tendon extends from the large to the small division of the organ, and acquires upon the latter its greatest thickness and whitest colour.

Upon bisecting the stomach lengthwise, the part described as the main cavity is seen to correspond with the cardiac division, and the seeming appendage, with the pyloric division, of the stomach in *Rodentia* : but they are much more distinct in structure and functions in the *Myrmecophaga* than in any other mammal with a stomach similarly divided externally. The cardiac cavity has a vascular secreting surface, the lining membrane being disposed in very numerous small rugæ ; at the parts where the parietes have yielded most to the distending force, these rugæ are nearly effaced : other larger and more permanent folds are nearly straight, are confined to the vicinity of the communication with the pyloric cavity, and converge towards the aperture.

The cardiac orifice, in the inverted stomach, presents the form of a narrow, slightly bent crescentic slit. It is situated about $3\frac{1}{2}$ inches from the similarly shaped aperture of communication between the cardiac and the pyloric cavities : but the margin of this latter aper-

* This paper will be reprinted in the Transactions, and there illustrated with 4to plates.

ture is indented as it were by the ends of the converging folds of the lining membrane, about ten in number, which are continued into the pyloric cavity. The length of the cardiac slit is 1 inch ; that of the intercommunicating aperture is 1 inch 3 lines.

The pyloric division of the Anteater's stomach is remarkable for the thickness of its muscular tunic and the density of its epithelial lining, which convert it into a veritable gizzard.

The muscular coat varies from one inch to half an inch in thickness ; at the middle of the cavity it is separated from the lining membrane by an unusual accumulation of the elastic submucous cellular tissue, which is most accumulated in the upper wall of the cavity. A very small proportion, only, of food can enter at one time into this cavity, to be subjected to the tritulating force of its parietes, operating with the aid of swallowed particles of sand in the comminution of the unmastered or imperfectly masterd termites.

The area of the pyloric cavity, as exposed by a vertical longitudinal section, appears a mere linear, slightly sinuous tract, with a dilatation near the pylorus, due to a kind of valvular protuberance of the upper wall projecting towards that aperture. But, when the pyloric cavity is bisected transversely, its area then presents a crescentic figure, owing to the protuberance formed by the thicker muscular tunic and the more abundant submucous elastic tissue in the upper parietes. The lower longitudinal plicæ, which commenced on the cardiac side of the intercommunicating aperture, give a longitudinally ridged character to the inner surface of the cavity.

This character is changed, near the pylorus, for a reticular rugosity : the pylorus, when viewed from the duodenal side, presents a crescentic form, with the horns of the crescent directed upwards. The lining membrane of the duodenum soon becomes smooth.

Mr. Gould communicated the following letter, lately received by him from M. Elsey, Esq., the Surgeon and Naturalist attached to the Expedition under the command of A. C. Gregory, Esq., now engaged in exploring the north-western and northern portions of Australia. Mr. Gould considered this communication to be of great value, inasmuch, as, besides mentioning that the writer had acquired an extensive collection of birds, it contains numerous very interesting observations respecting the various species which had been met with in the neighbourhood of the Victoria River Dépôt, N.W. Australia, lat. south $17^{\circ} 34' 30''$; their interest being much enhanced by the circumstance of many of them referring to several forms not previously known to occur in that part of the country.

Victoria River Dépôt, N.W. Australia,
S. Lat. $17^{\circ} 34' 30''$.
June 1856.

MY DEAR SIR,

I am sorry I cannot send you any account of large collections or extensive ornithological notes. Circumstances over which

I could have no control have kept me a close prisoner at this camp since last October. My collection of birds comprises up to the present time 103 species, some of which are, I think, new. Of Hawks I have five kinds, including two species of *Milvus*. The latter feed entirely on grasshoppers, are most cowardly birds, and utter a peculiar shrill wailing cry. The first I procured was of a very uniform dark, dirty brown colour. It was common on our first arrival here, but disappeared about December, and was soon replaced by *Milvus affinis*, which has latterly become very numerous, and now perches in hundreds on the trees around the camp. These birds are excellent eating, and certainly exceed any other game we have here in flavour and tenderness. There are also three Eagles, neither of which I have been able to get, for though knocked down with our largest shot, they have got away; one has a dark-slate upper surface and wings, and white breast and belly. It frequents Sandy Island, the Stony Spit, and other parts of the river where sandbanks afford good fishing ground. The second is smaller, and of a pure white. I have only seen it once, when passing some dangerous rapids in the boat. The third is brown, with a very light-coloured and small head and neck, while the wings have an immense expanse. I should mention that one of our men found the black and white Eagle nesting in April. The nest was of immense size, and contained a single purely white egg of an almost globular form.

I have three Owls. The Barking Owl of these parts is a fine bird, the upper surface of which is beautifully mottled with dark-red and cinnamon-browns; while the under surface is white, with a central streak of brown in the feathers of the breast. It builds in the hollows of the huge Gouty-stem tree (*Adansonia*) of this coast, and incubates in March and April. Another is a large dirty slate-brown bird, with rough, dull yellow beak and legs. I procured one specimen only early in November, most likely a stray bird. The third was an *Athene*, rather smaller, of a mottled brown. The stomachs of all the specimens of the *Athene* were crammed with orthoptera.

There is one true *Caprimulgus* here, of a beautiful warm mottled brown and black, and with white on the wings. It lays a dull white or greyish egg, marked with dirty green, at the foot of a tree, on the bare uneven ground. I have two species of *Egotheles*, both of which I flushed from the holes of trees; and I have seen a large *Podargus*, with huge cellular mandibles, which was shot by the mate of the schooner, and spoilt by insects when I saw it.

About the middle of December a large flight of Swallows arrived from the south, high in the air and out of shot. They remained about us one afternoon, wheeling in the air, but did not pitch, and were gone next morning. A little Martin common here just now (May and June), is equally shy, and I cannot find its place of resort. Two *Dacelos* are frequently seen: one entirely coloured with shades of blue and grey, and with a crest of lengthened feathers on the back of the head; the other blue and warm red-brown, with finer and stronger tints than the other, and without a crest. A dull-

coloured *Halcyon* (?) *sanctus* is common; and I have shot a single pair of the beautiful *Alcyon pulchra*, which I have only seen once. My men, some of whom take great interest in my collection, mention another, which I have not seen. According to their account, it is a lovely bird, the under surface fine purple, &c. Of *Artamus* I have several species, but have no means of determining them. They usually frequent stumps and dead logs in open flats, in twos and threes, and are very active. One species only, a dusky little fellow, lives on the tops of the ranges. I have seen a number of this species sitting round the top of a lofty Palm (*Levistona*), whose head had been struck off by storm or whirlwind; it was more than 80 feet high, and, swayed in the breeze and the circle of birds, with their heads directed inwards and their tails turned outwards, had an absurd effect. Of Shrikes I have two or three, including *Grauculus melanops*. I do not know *Grallina Australis*, nor have I heard its cry, so often alluded to by Leichardt, unless indeed a black and white bird with whitish very long tarsi, and white, rather blunt and soft beak, which builds a mud nest in the branches of trees near the water, be it. It has a peculiar shrill cry as it rises from the water, and is called the "Water Magpie" by our stockmen.

Of Fly-catchers and Robins, so called, I have seven or eight species. One robin has a slate-grey back, black head and wings, and chestnut flanks, with a white stripe over the eye; it lives in the mangroves, and may be recognized at all times by its pretty little piping note. I found it nesting in November and again in February and March; the nest is an open, shallow, slightly constructed one; the eggs two in number, dull greenish-grey, speckled with brown mostly at the larger end.

There are three or four Wrens; one a brilliant glossy black, with scarlet back and rump; this is the male bird, which does not attain this plumage till the second moulting. The young birds are uniform dull wren colour. After the first moulting they have a darker tint, and a few feathers between the shoulders tipped with red, and perhaps a single black feather in the tail. At the second moulting they acquire all their gloss, and may then be seen surrounded by a group of newly fledged birds. The female is dull wren-brown, with a lighter under surface. There is another beautiful Wren much larger and longer in the body; it has a beautiful purple top to the head, with oval spot of glossy black in the centre, and black zone outside it; the body is greyish-brown; the tail is long, of a blue tint, and having a sort of water-mark, if I may so call it, on the surface, which gives various shades to the colour. There is also another Wren of the same size and form and with a similar tail, but with a plain grey head and a chestnut spot over the ear-coverts. This is a female, the other a male; of each I have only a single specimen. All these build a dome-shaped nest of grass, in a low bush or tuft of grass, and lay about February and March four white eggs, quite translucent: the yolk shining through gives them a rose tint. I have shot lately (May) a bird allied to *Cinclorhamphus*, but to what genus it belongs I do not exactly know. Of two specimens one had

in its stomach large green seeds, the other bark, bugs and various insects.

The Finches are very numerous and very beautiful. I have ten or twelve species, including *Estrela annulosa* and *Poëphila personata*, of which there are two or three varieties, similar in size, habits and body colour, but differing in the glossy black of the face and chin, and in the colour of the beak and legs. The beautiful *Poëphila Gouldiæ* is tolerably numerous; of this also there are two varieties or species: one with a black face, surrounded by a line of bright blue; the other has the anterior half of the face scarlet, the rest black, edged with blue. Of both the breast is bright purplish-lilac; the belly canary-yellow; the back a mixture of bright green and dark brown, with light blue mixed over the rump.

There are two *Donacolas*: *flaviprymna*, and a crimson and brown one, of which there are one or two varieties. The *Donacolas* build in some parts in low tea-trees overhanging water, making a large spouted nest with a small cavity, of dry bark of tea-trees; and *Pandanus*. The *Poëphila* generally have large nests of grass on the ground or in low tufts of grass; one species builds in the small bushes of *Calliotrix* and *Melaleuca*, and composes its nest of minute dry twigs, often so slenderly that it appears to have a double opening. The *Estrelæ* build smaller and stouter nests in young *Eucalypti* and small trees, from 15 to 20 feet high. They all lay six white eggs.

I have met with two or three nests of the bower bird, *Chlamydera nuchalis*, but no one of my party has seen the birds.

The Crow of this part of the country is a large bird, generally solitary, with a small eye and hazel-brown iris; it is very wary, and with difficulty shot.

The *Meliphagidæ* are not numerous, at least the more common species; the *Tropidorhynchus* is feathered all over the head, and does not merit its vulgar name. There is another resembling it somewhat here, but without its singular voice, and with a stouter beak. It is much like *Anthochaera*. A true *Merops* is also met with.

I have been unable to learn anything of the habits or nidification of the *Meliphagidæ* at present.

I have not observed any true Cuckoo here, and have failed to discover the *Cuculus dumetorum* of this coast; but I have seen two Cuckoo Pheasants (*Centropus*), one much lighter-coloured than the Moreton Bay species; the other with an almost black under surface, and the general plumage of a dark tint.

A *Climacteris* of dusty-brown plumage, with a brownish-yellow spot on the wings, looks very handsome when sailing with outspread wings and tail from tree to tree, or when hopping round the trunk and branches of the gum-trees, where it feeds much on the larvæ contained in the small tough cylindrical chrysales suspended in hundreds in the cracks of the bark. It loses all its beauty when prepared as a museum specimen.

Of Cockatoos: *Cacatua galerita*, *sanguinea*, and *Eos*, are abundant here, the two latter especially. Leadbeater's Cockatoo, with the fine

red crest, was also seen on the southern slope of the dividing range south of lat. 18° S., and extending to the margin of the desert in lat. 20° S. It is common in the northern districts of West Australia, north of the Murchison. I have been hitherto most unfortunate in my attempts to get a Black Cockatoo. Several, however, have been shot and their tail-feathers, &c. brought in. I found *Aprosmictus erythropterus* for the first time in January; on dissection, I found the os furcatorium very small, and buried in the substance of the pectorals.

I have not found a single *Platycercus* or *Euphema*, and only two Honey Parrots, *Trichoglossus versicolor* and *T. rubritorquis*; *Nymphicus Novæ-Hollandiæ* appeared suddenly in the beginning of April, and was followed in about a fortnight by *Melopsittacus undulatus*; both became very numerous, feeding about the burnt patches of ground; they are now (June) becoming scarce.

Pigeons are not very numerous. I found *Ptilonopus Swainsoni* at Quail Island on the coast near Port Paterson, and the fine *Carpophaga leucomela* at Point Pearce, near a swamp at which we were encamped in October; I was unable to preserve it, and have not seen it again.

Phaps histrionica, or a pigeon very similar to it, has been found lately in May, and another Bronze-wing smaller, and of a uniform greyish brown with white tip to the tail, red cere, and silver-grey iris, has been common during our stay. I have been disappointed in not getting *Geophaps plumifera*. It was often seen on the route from Point Pearce, and was very numerous, with another and larger-crested Pigeon at the second depôt, established on a branch of the Upper Victoria in lat. $17^{\circ} 3'$ S.

The *Petrophassa albipennis* is common among the sandstone cliffs of the ranges. Of two *Geopelia*, one is speckled, and has a silver-grey iris; the other has a beautiful lavender-coloured breast, and pink iris, with broad bright red orbits. Both are elegant, timid birds, and their liquid voices can be heard during the heat of the day, when all else is still. Neither of these Pigeons has the peculiar vocal powers noticed in *Geop. tranquilla* by Captain Sturt. The speckled one makes a very slight flattish nest of sticks on the horizontal fork of a branch, in which it deposits two white eggs.

One *Megapodius* was shot at Point Pearce, where in the hurry and confusion I could not preserve it; it was of compact form, of a uniform olive-brown plumage, with a stout beak, red iris, and strong tarsi and toes, the hinder especially. No mounds were seen during our short stay there.

A small Quail is common among the grass, but I have not yet obtained it.

Both *Dromaius* and *Otis* are of the same size, and in every way similar to those of the south; we have nowhere confirmed the observations of Leichardt and his black fellow as to their smaller size. Indeed Mr. Gregory believes, and I think most justly, that the *Emu* may cross the entire continent from east to west, or north to south,

its habits being strictly wandering. It has no regular feeding ground or drinking place; its tracks are everywhere, and it is for ever on the move.

Of Waders I have a considerable number, but am unable to determine many of the species, as I am entirely without books of reference. I have found the beautiful *Lobivanellus lobatus* common during March and April on the sand-banks of the fresh water; it was usually associated with a small white *Himantopus*, with black wings and head. A long and pointed winged bird resembling *Glareola* is also frequent; it feeds on the wing, on grasshoppers, &c. about the *Polygonum* and other bushes fringing the banks.

I have seen *Falcinellus*, but could not get it. I have also one white *Platalea*, the *Jabiru* or *Mycteria*, and two or three Herons. The Night Heron, *Nycticorax*, is common, frequenting the dense mangroves, where it remains during the day, but flies at the most distant noise. I have also a single specimen of *Tribonyx* and *Fulica*.

I have not had much opportunity of procuring *Natatores*. The Whistling Duck is very common, and was frequently shot on lagoons in the interior, but is very wary on the river. Large V-shaped flights of them passed over our camp during March from S.E. to N.W., in which direction they appear to have a favourite resort. I have also another Duck, similar to it, but smaller, with a soft dull-brown plumage.

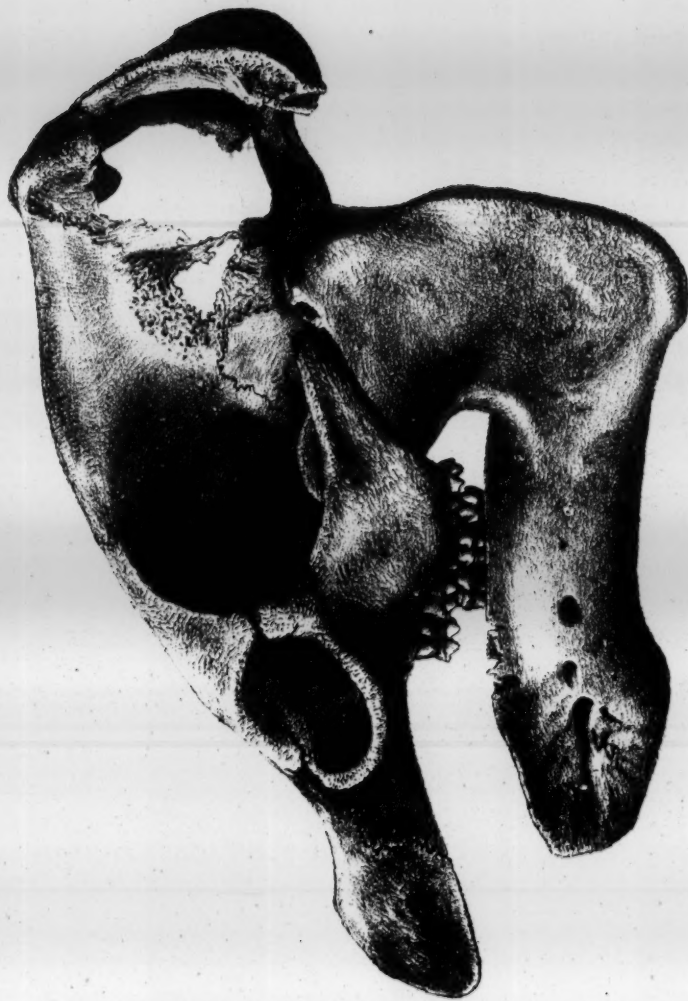
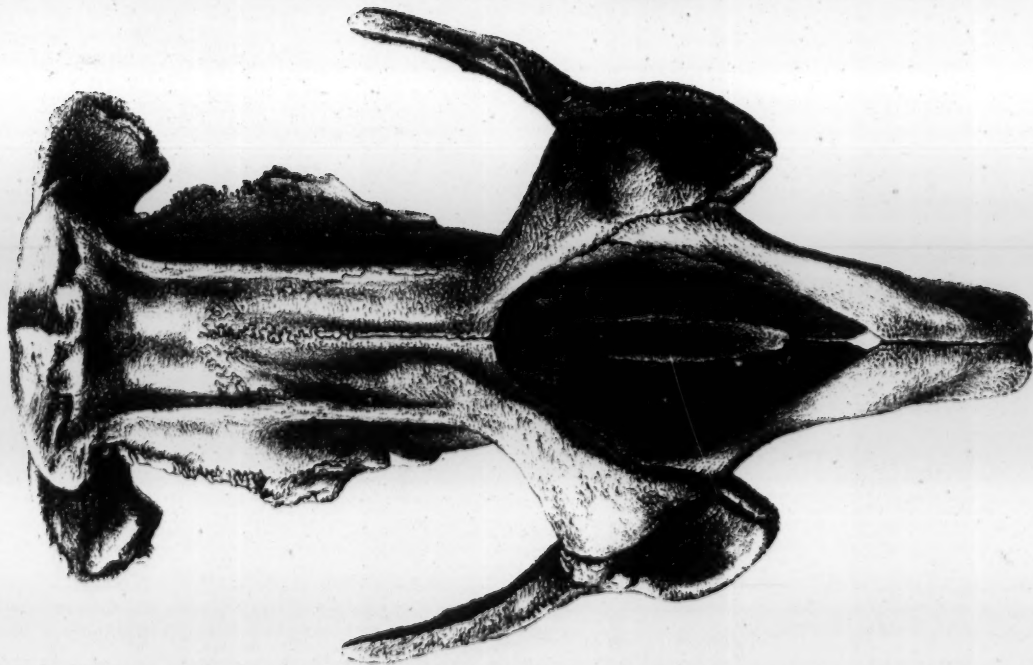
I have seen *Nettapus pulchellus*, but could not get it. Indeed my opportunities of examining the river have been so much more limited than those Captain Stokes enjoyed, that many of his birds I have not even seen. And owing to our small number I have generally on these excursions been obliged to take an oar myself, and could not therefore keep a very bright look-out.

The *Plotus* is common here, and excellent eating. During February and March it was incubating. It chooses large trees that hang over the water above or through the mangroves, and in these a number of them build a colony of large coarse flattish nests of dead sticks and twigs, which appear, from the quantity of dirt about them and their stained appearance, to be used year after year. Each season they place in the centre a few fresh green leaves, and on these lay three or four white eggs, with a very earthy opaque, but brittle shell; the lining membrane is of a blue-grey colour; they are rather smaller and more elongated than a hen's egg. We have enjoyed many fine meals of these eggs, sometimes getting from forty to fifty in a single tree. Both birds sit. The male is of a glossy greenish-black, with a little brownish-grey on the wings and wing-coverts. The female has a white under surface, but is otherwise similar.

The Pelican is white, with black wings, and a very fine blue and purple margin round the pouch. It is, I presume, *Pelecanus conspicillatus*. Its breeding season is March and April.

I have thus endeavoured to give you a rough abstract of my collections hitherto; I am now about to begin work really, as I start with the party in a few days for the Albert River, and from thence,

5 00 58



MANATUS VOGELI ? Owen

if all's well, to Moreton Bay. I shall have much pleasure in writing to you from the Gulf of Carpentaria, should I have anything of interest to communicate.

I remain,
My dear Sir,
Your obedient Servant,
M. ELSEY.

John Gould, Esq.

February 24, 1857.

Dr. Gray, F.R.S., in the Chair.

The following papers were read:—

1. ON THE SKULL OF A MANATUS FROM WESTERN AFRICA.
BY DR. BALFOUR BAIKIE, F.R.GEOG.S.

(Mammalia, Pl. LI.)

Until very recently but two species of the somewhat scarce genus *Manatus* have been acknowledged by naturalists, viz. *M. australis* (the *M. Americanus* of some writers) and *M. Senegalensis*. Of these the former inhabits chiefly the mouths of the great rivers of the north-eastern coast of South America, and the West Indies, while the latter is confined to the tropical portions of the western coast of Africa. Some writers, as Hernandez, mention a species found along the coasts of Peru, but, if so, little or nothing is known of it or its habits. Wyman has described as *M. nasutus* what is probably a variety of *M. Senegalensis*, and Harlan as *M. latirostris* another Manatee from the Gulf of Mexico, which, however, seems to be a good species.

Individual specimens of *Manati* have rarely been met with along our own shores, as that recorded by Prof. Fleming* as having occurred in the Shetland Islands in 1823; and I am in possession of tolerable evidence, which I intend shortly to publish, that a similar animal has made its appearance from time to time in Orkney, where it is not unknown to fishermen. These are most probably stray members of *M. australis* which have crossed the Atlantic, which belief is, to some extent, supported by the fact that in Orkney they have always been seen on the western or Atlantic side of the islands.

The *M. Senegalensis* has been found in the Senegal, the Gambia, and some rivers of Western Africa; and *Manati* have also been

* Vide Fleming in Edin. New Phil. Journal, and Baikie and Heddle's 'Historia Naturalis Orcadensis.'

known to occur in various rivers opening into the Bight of Biafra, which have hitherto been referred to the same species, partly because no specimens had hitherto been critically examined, and partly because it seemed unlikely that two species of a genus so unprolific, even in individuals, should exist in localities so very near to each other. All probability from previous knowledge, or in the absence of more precise or more extended information, merely justified a belief in the existence of two species, one inhabiting the New World, the other peculiar to some tropical portions of the Old World.

The differences between *M. australis* and *M. Senegalensis* are quite evident. The former seems to grow to a greater size, and the shape of the skull at once distinguishes it, being altogether larger, with a more lengthened nasal opening, and more elongated intermaxillary bones, giving it a large mouth. The lower jaw, also, is less massive and angular, and its inferior margin less curved. It would seem to approach more to the fragmentary extinct forms described by Cuvier in his 'Ossements Fossiles.' In *M. Senegalensis* again the skull is more compact, the snout shorter, the lower jaw more angular with its lower border more curved, and the zygomatic process of the temporal is less elevated.

In 1851, while Dr. Barth was journeying towards the country of Adamáwa in Central Africa, he heard from the natives, accounts of an animal said to frequent the rivers and marshes named by them Ayú (erroneously written Ajúh). He heard of the same animal, under the same name, also up the river Kwóra or Niger below Timbúktu, and he believes that it also exists in the river Shári, which runs into the marshy Lake Tsád. Dr. Barth not having been able to satisfy himself about this creature, directed Dr. Vogel's attention to it, and the latter gentleman fortunately met with a specimen in September 1855 in the upper part of the Binuë or Tsádda. An account of this Ayú having been sent by him to England, and read at the British Association Meeting at Cheltenham, Prof. Owen thought that it presented sufficient peculiarities to distinguish it as a species, which he indicated as *M. Vogelii*; but his remarks partly applied to a *Manatus* skull, which was exhibited at the time, and which by some misconception persons present had been led to consider as belonging to the very individual described by Vogel.

During the months of September and October 1854 I ascended the same river; but though this was the period when they ought to have been most abundant, yet I neither saw nor heard of any such animal; and though I always carefully examined the hunting relics in the various villages, yet I never met with its remains. From this I am led to confirm Dr. Vogel's statement, that it is a rare and scarce creature. But on the 13th July previous, just after I had entered the mouth of the Kwóra and Niger from the sea, I had spent the day in examining some of the interminable dreary creeks, which are there so apt to perplex the voyager. While returning in the afternoon I saw under some palms and mangroves a collection of miserable huts, hardly entitled to the appellation of a village, towards which I pulled and presently landed. The inhabitants in great alarm all fled

into the bush, and could not be induced to come out, so I walked through their habitations, looking around me, but finding nothing but heaps of nuts of the oil-palm. But just before embarking, my eye caught a heap of dry bones, placed evidently by the negroes as their dju-dju, or sacred heap, remains of their hunting achievements, and now dedicated to their deity. I eagerly examined the mass, but found to my grief that it was composed mostly of fragments, among which were portions of skulls of goats, of a bullock, and of a crocodile; but on turning these over I saw a more complete relic, one which struck me as being peculiar, and as something I had not previously seen. This I carried off, and it turned out to be the nearly complete skull of a *Manatus*, which was the skull exhibited at Cheltenham. Having had time lately to examine it, I found it to exhibit the peculiarities remarked by Prof. Owen, and the result is as follows:—

General Measurements.

	inches.
Extreme length	$12\frac{1}{2}$
Greatest depth	8
Length of nasal orifice	$4\frac{1}{4}$
Breadth of nasal orifice	2
From edge of orbit to extremity of snout	$3\frac{5}{8}$
From anterior molar socket to extremity of snout	$3\frac{3}{8}$
From anterior edge of infraorbital foramen to ditto	$3\frac{1}{4}$
From maxillary and intermaxillary suture to ditto	$1\frac{3}{4}$
Greatest depth of zygomatic arch	$2\frac{1}{2}$

The proportions of the skull are more elongate than those of *M. Senegalensis*, but less so than *M. australis*. Top of skull oblong, bounded by two almost completely parallel ridges on the frontal and parietal bones. Frontal suture remaining, parietal bones united. Breadth of orbits nearly one-half of their length; orbits directed outwards, nearly in a plane with the snout at an angle of about 40° ; lower edge of orbits circular, smooth, and not tuberculated. Intermaxillaries more lengthened than in Cuvier's figure of *M. Senegalensis*, but much less deep, and not nearly so elevated along the anterior angle of the nasal cavity. Cavities for nine upper molars, the anterior being but a single socket, the others adapted for three dental fangs, one internal, and two external and lateral. Fangs flattened and slightly expanded at extremity; the two external directed immediately upwards; the internal one, rather the longest, directed upwards and inwards, especially the more anterior ones. Two posterior molars still undeveloped. Molars multicuspid, with two transverse irregularly tri-tubercular ridges, the posterior one being generally partially divided into two by a small groove. The ridges on the remaining anterior molars (third and fourth) much rubbed down and worn, exposing the dentine. Remains of one incisive socket at extremity of each intermaxillary near the suture. Incisive foramen pyriform, the base anteriorly.

Lower jaw less massive than in *M. Senegalensis*, with posterior

angle less marked, and lower border much less curved; opposite sides completely anchylosed, a deep hollow under upper and inner edge. Cavities existing for eight molars, the socket of the anterior one being simple; two posterior molars but partially developed. Lower molars more distinctly three-ridged than the upper ones, but the ridges less evidently tri-tubercular. Molars with two fangs, anterior and posterior, resembling the two external fangs of the upper molars, directed downwards, flattened and expanding, especially the posterior one. Molars deciduous from before backwards, seemingly forced out by the gradual advance forwards of the posterior ones.

The temporal bones being both wanting, I am unable to speak of the zygomatic processes, which differ in shape in the two previously known species.

Dr. Vogel's measurements being from an entire head, while mine are from the dried skull, the size of the respective animals will nearly approach each other, mine being rather the smaller. In the distance between the orbit and the snout, on which Prof. Owen lays stress, they will be found so fairly to agree that they may be presumed to belong to the same species. Let us now therefore see whether the other measurements and proportions of the one we have been considering differ sufficiently from others to favour the presumption of its being a species. In *M. Senegalensis*, the contour, looking at the skull from above downwards, is nearly that of an isosceles triangle, closely approaching an equilateral triangle, while that of *M. australis* more resembles the outline of a violoncello. In the Niger specimen again, the form, though more nearly resembling the former, is certainly of an intermediate character, the base of the triangle being shorter in proportion. The profile view of *M. australis* shows a lengthened, rather narrow beak, while *M. Senegalensis* has one shorter and remarkably deep; and here again we have an intermediate form, the shape in this case certainly more resembling *M. australis*. The inferior border of the lower jaw of *M. australis* is long and straightened, while that of *M. Senegalensis* is short and curved, its posterior angle, also, being more massive and decided, and approximating to that of the Dugong. Here again the Niger Manatee intervenes, the angle being more obtuse, and the curve less than in the Senegal species. The proportion of the length of the nasal opening in *M. australis* is to the breadth as 3 to 1, in *M. Senegalensis* as 1 to $\frac{2}{3}$, but in my specimen as 2 to 1. The coronal suture, sharply angular in the South American and almost semicircular in the Senegal species, is in the Niger one acutely arched. The temporal ridge irregularly converges posteriorly in *M. australis*, in *M. Senegalensis* they gently diverge, while here they run antero-posteriorly almost entirely parallel. The temporal bones being, as I have remarked, absent, I cannot speak of the temporal zygomatic apophyses; but the molar portions which remain would seem to indicate a continuance of the same intermediate character.

But in a few points the Niger skull is peculiar, and differs quite from the others. Thus the superior and anterior angle of the parietal bone extends much further forward than in either of the others, being

to within less than an inch of the posterior angles of the nasal opening. The anterior edge of the post-orbital apophysis and the lower margins of the orbits are plain and smooth, not irregular. The vomerine sheath is not nearly so prolonged anteriorly, and does not reach to within an inch of the anterior incisive foramen. The maxillary and inter-maxillary do not unite by a bevelled surface, but by a suture forming a right angle.

On one point we can draw a tabular view of the whole of the skulls, viz. as to the comparative distance of the orbit from the end of the beak, which, compared with the total length of the skulls, is as follows :—

In Dr. Vogel's entire head of the Ayú as 7 to 36, or about 1 to 5.

In the skull from the mouth of the Kwóra as 27 to 100, or more than 1 to 4.

In the skull of *M. Senegalensis* as 1 to 3 nearly.

In the skull of *M. australis* as 5 to 14, or less than 1 to 3.

From what I have drawn out we may, I believe, make the following deductions: 1st, That in the Kwóra or Niger, and its tributary the Tsádda or Binuë, is found a *Manatus* intermediate in many of its characters between *M. australis* and *M. Senegalensis*; and 2ndly, That if these differences are, as Prof. Owen suggests, too marked for a mere variety, then there is no alternative but to allow it as a species. I do not mean to affirm its positive existence, but merely following up the idea thrown out by Prof. Owen, in examining the skull I brought home, I think the *probability* of its distinctiveness is considerably increased. Being about to revisit the river Kwóra I shall make a point of searching more closely after this animal, with a view to settling the question. If established, the genus will stand as follows :—

MANATUS, Rondel.

1. MANATUS AUSTRALIS, Tiles.

Hab. West Indies and north-east coast of South America.

2. MANATUS SENEGALENSIS, Desm.

Hab. African rivers, Senegal to the Gambia.

3. MANATUS VOGELII, Owen.

Hab. Rivers opening into the Bight of Biafra.

Whether *M. nasutus* of Wyman and *M. latirostris* of Harlan are species, varieties, or synonyms, I have not the means of ascertaining.

M. australis is, as I have mentioned, more allied to the extinct fossil forms; and *M. Senegalensis*, again, more approaches in form of skull to the Dugong.

2. A MONOGRAPH OF THE GENUS LASIURUS. BY ROBERT F. TOMES, ESQ.

The object of the present memoir is rather to enumerate and describe all the species at present arranged under the above name, than to enter into the claims of the group to be considered as a distinct genus.

An attempt is also made to give a tolerably correct synonymy; but there are so many descriptions which appear to refer to varieties only, as to render this part of the work by no means easy, and not altogether satisfactory. Attached to the account given of the first species on the list—*Lasiurus noveboracensis*—will be seen a rather voluminous list of synonyms; and it may appear as if undue regard had been paid to the labours of other writers, in thus reducing to one species what has by them been considered as constituting at least six. But in the examination of a large number of examples, I have felt myself quite unable to come to any other conclusion than the one here given. The various descriptions apply to the same species under the influence of the climate of different degrees of latitude. Thus the *Vespertilio noveboracensis* answers well to the account given of it in its proper locality; but as we proceed southward, we find that a Bat occurs, having precisely the same form and size, but differing somewhat in the colouring of the fur; and this difference continues to increase until we reach the tropical parts of America, where a *bright ferruginous* colour completely supersedes the original *hoary-brown*, or, as it might not improperly be called, *roan-colour*.

At various localities it has been met with by travellers, and the colour of the fur varying with most of them, has given rise to the great multiplicity of names. A large series has passed under review whilst preparing this paper, and the most exact and rigorous examination, both externally and internally, has failed to afford any material difference, beyond that of colour.

I have already referred this to the effect of climate; but it is necessary to add, that the colour of the fur is so capricious, even in the temperate parts of North America, that Major Le Conte, when describing specimens from the vicinity of Philadelphia, found the varieties so perplexing, that he could give no very definite description.

However, it may be stated, that *generally* the North American examples are some mixture of brown or rufous, thickly sprinkled with white, giving a hoary appearance; whilst those from Tropical America are almost uniformly of a bright ferruginous hue, without any mixture of white.

1. LASIURUS NOVEBORACENSIS, Erxl.

Vespertilio noveboracensis, Erxl. Syst. Règ. Anim. p. 155, 1777; Harl. Faun. Amer. p. 20, 1825; Godm. Amer. Nat. Hist. i. p. 50, 1826; Fisch. Synop. Mam. p. 114, 1829; Coop. Ann. Lyc. N. H. New York, iv. p. 57, 1837; Le Conte, Proc. Acad. Nat. Sci. Philad. 1855.

New York Bat, Penn. Arc. Zool. p. 184, 1792; Synop. Quad. p. 367, 1771.

Vespertilio rubellus, Palisot de Beauvais, Cat. Peale's Mus. 1796.

Vespertilio lasiurus, Linn. edit. Gmel. 1788; Schreib. Säugt. 1826; Geoff. Ann. du Mus. viii. p. 200, 1806; Desm. Mam. p. 142, 1820; Fisch. Synop. Mam. p. 109, 1829.

Vespertilio Blossseivillii, Less. et Garn. Bull. des Sci. Nat. viii. p. 95; Fisch. Synop. Mam. p. 110, 1829.

Vespertilio Bonariensis, Less. Voy. de la Coquille, 1829.

Vespertilio villosissimus, Geoff. Ann. du Mus. viii. p. 478, 1806; Desm. Mam. p. 143, 1820; Fisch. Synop. Mam. p. 110, 1829; Rengg. Säugt. von Parag. p. 83, 1830; Wagn. Supp. Schreib. Säugt. i. p. 536, 1840.

Vespertilio monachus et *V. tessellatus*, Raff.?

Nycticejus noveboracensis, Temm. Mon. ii. p. 158, 1835-41; Wagn. Supp. Schreib. Säugt. i. p. 546, 1840; Schinz. Synop. Mam. i. p. 199, 1844.

Nyct. varius, Poep. Reise in Chili, i. p. 451, 1835; Wagn. Supp. Schreib. Säugt. i. p. 547, 1840.

Nyct. Atalapha, Raff.?

Atalapha Americana, Raff. Prod. de Som. ?; Desm. Mam. p. 147, 1820.

Chauve-souris septième, Azara.

Lasiurus rufus, Gray, Cat. Mam. B.M. 1843; Gosse, Nat. So-journ. Jamaica, p. 280, 1851.

The muzzle is of very moderate length and substance, and rather pointed; the nostrils are rather small, near together, and directed sublaterally. The end of the nose, between the nostrils, is somewhat emarginate. The ears are short, ovoid, and very much rounded at their tips, which are directed outwards. Towards the base of the front edge of the ear is a lobular projection, occasioned by a notch in the margin immediately under it, quite at the base of the ear, and contiguous to the tragus. The outer margin is continued forward along the side of the face toward the angle of the mouth, and ends near to it, in the form of a moderately developed lobe. The tragus is narrow at its base, from which it expands evenly and rather rapidly for half its length, where, making a conspicuous angle, it slopes inwards, and comes to a narrow but rounded point, its inner margin all the time maintaining a nearly straight line, excepting near the tip, where it has a decided inward curvature. The outer marginal angle, already mentioned, is something more than a simple angle, being, in fact, a rounded projection from the crooked edge of the tragus.

The wing-membranes extend to two-thirds of the distance between the extremity of the tibia and the base of the toes.

The face is more or less covered with hair on all parts, the end of the nose and the margins of the lips only being naked. On the forehead the fur is very thick, and approaches nearly to the end of the nose. Immediately in front of the eye, is a tuft of stiff hairs.

and on the upper lip is a moustache of softer ones. The inner surfaces of the ears are sparingly suffused with very fine short hairs, as are also their outer margins.

The interfemoral membrane is densely hairy on the whole of its upper surface, and the same peculiarity extends to the upper surface of the feet. The fur of the back also extends on to the membranes of the wings, over and beyond the tibia, but is there bounded by a well-defined line. It differs in this respect from the fur of the under surface, where it is seen to extend along the membrane beneath the fore-arm, somewhat irregularly scattered, and having the appearance of yellow down. Towards the wrist it becomes thicker, and is more especially so about the base of the fourth finger. This finger is also seen to be fringed with fine soft hairs at its base, when viewed from above; and a small patch of hair is visible at the base of the thumb.

Everywhere the fur is soft in texture, rather long, and tolerably thick. That which extends on to the under surface of the membranes, is unicoloured, and of a yellowish buff colour. A narrow stripe of fur, bounding that of the back on each side, is frequently of the same colour. But the colour of the body varies so much, that it appears desirable to give a short description of each of the extreme varieties, observing, at the same time, that every intermediate state may be met with.

Var. 1. Fur of the back of four colours, dark near to the skin, succeeded by yellowish brown, which is again succeeded by pale rust colour, and finally tipped with white.

Beneath, the fur is nearly similar, excepting that which is contiguous to and on the membranes. This is unicoloured and pale buff.

Hab. North America, "from one end of the country to the other, equally numerous" (*Le Conte*).

Var. 2. Similar to the last, but with the colour brighter and without the white tips to the fur.

Hab. The same as the last.

Var. 3. Fur of the upper parts nearly black at the base, succeeded by yellowish-buff, passing into bright ferruginous-red, shining and silky. That on the interfemoral membrane uniform bright ferruginous. Beneath, the fur is nearly black at its base, passing into dark brown, and tipped with bright rust-colour. The fur on the under surface of the membranes is also of the latter colour. Sometimes this variety has the chin and throat of a yellowish-buff colour, and then answers well to the description of *Nycticejus varius*, as given by Poeppig.

Hab. South America; Jamaica; Canada.

In all these varieties a white spot is observable at the axilla. The membranes appear to be light or dark, according to the depth of the colour of the fur. Frequently the membranes of the wings,

near to the sides of the body, exhibit a singularly spotted appearance, occasioned by the network of veins being paler in colour than the portions enclosed by them. It was probably to one of these that Rafinesque applied the appropriate epithet "*tessellatus*." The example in which I have seen this peculiarity most conspicuous, was obtained in the Island of Mackinac, between Lakes Huron and Michigan, by my friend Mr. P. L. Sciater, who, knowing how much I am interested in this order of Mammals, kindly presented it to me, with other North American Bats collected by him in the autumn of 1856.

Dentition.—In. $\frac{1.1}{6}$, C. $\frac{1.1}{1.1}$, P.M. $\frac{2.2}{2.2}$, M. $\frac{3.3}{3.3} = \frac{14}{18}$.

The first pre-molar on each side in the upper jaw is small and rudimentary, and perhaps is sometimes wanting. It is placed in the angle between the canine and the contiguous pre-molar, in such a manner as not to be visible from the outside.

	1.		2.		3.		4.		5.	
	In.	Lines.	In.	Lines.	In.	Lines.	In.	Lines.	In.	Lines.
Length of the head and body...	2	1	2	1	2	2	1	11	2	7
— of the tail	1	11	2	0	2	0	1	10	...	...
— of the head	0	8½	0	8	0	8	0	7½	0	7½
— of the ear	0	3	0	3	0	3	0	3	0	3½
— of the tragus	0	2	0	2	0	2½	0	2	0	2½
— of the fore arm	1	7	1	6½	1	7½	1	6½	1	5½
— of the longest finger ...	3	3	3	2	3	5	3	2	2	11

2. LASIURUS PRUINOSUS, Say.

Vespertilio pruinus, Say, Long's Exped. Rock. Mount. i. p. 168, 1825 (?); De Kay, Nat. Hist. New York, i.; Fisch. Synop. Mam. p. 113; Godm. Amer. Nat. Hist. i. p. 68; Harl. Faun. Amer. p. 21; Coop. Ann. Lyc. N. H. New York, iv. p. 54.

Scotophilus pruinus, Gray, Mag. Zool. Bot. ii. p. 498, 1838.

Nycticejus pruinus, Tamm. Mon. ii. p. 154, 1835-41; Wagn. Supp. Schreib. i. p. 544; Schinz. Synop. Mam. i. 197.

Lasiurus pruinus, Gray, Cat. Mam. Brit. Mus. p. 32, 1843.

Vespertilio cinereus, Palisot de Beauvois, Cat. Peale's Museum, 1796.

It is not unusual to see the name of this species attached to specimens of the former, an error not easy to commit, if actual comparison of the two were made. The present one is greatly superior in size to the last, and besides this, presents some other very distinctive characters.

The head is broad, and the forehead flat; the muzzle is obtuse; the nostrils are surrounded by a well-defined rim, are directed sublaterally, and separated by a considerable interval, which is emarginate. The ears are irregularly round, their front margins projecting considerably over the forehead. Their outer or hinder margins are brought forward along the sides of the face in the shape of narrow prolongations, and terminate in two slightly projecting lobes behind the corners of the mouth. The tragus appears to offer some slight variations of form in different individuals, and even in the

same specimen I have, in one instance, observed it dissimilar in the two ears. In its general form it resembles the same part in the last species, but it is much less attenuated towards the tip, and the outer margin has a less distinctly angular projection. At its base it is of average width, from which it expands rather rapidly, and proceeds outwards for the distance of about a line, when it takes an upward direction, and becoming narrower, ends in a rounded tip. This change of direction from horizontal to vertical leaves an angle at its outer edge, which is nearly a right angle, whilst its inner edge maintains a pretty regular concave line from the base to the tip. In one instance, above alluded to, I have observed it in one ear only of full breadth at the base, and gradually curving upwards and inwards, terminate in a rounded end, about half the breadth of the base; the tragus of the other ear being of the usual form.

The membranes of the wings barely extend to the base of the toes. The thumb is rather long, and has its terminal phalange twice the length of the basal one.

The fur of the forehead extends nearly to the end of the nose. The sides of the face, and the muzzle, are moderately hairy, with a tuft of stiffish hairs in front of the eye, and a black moustache fringing the upper lip. The chin is nearly naked. A patch of fine, short, adpressed hairs occupies the inside of the ear near its tip, and the exposed surface of the tragus is similarly furnished.

Seen from beneath, the whole of the antibrachial membrane is covered with close downy hair of a yellowish colour, and fur of the same kind extends from the side of the body along the membrane beneath the arm and fore-arm, to the bases of the fingers, which, in some examples, are completely obscured by it. In breadth this band of fur varies from half to three-quarters of an inch, widest towards the fingers. Only a portion of the base of the interfemoral membrane, as seen from below, is hairy.

Viewed from above, the whole of the interfemoral membrane is hairy, as are the feet and legs, and a portion of the membrane of the wings, where they are attached to the sides of the body. The hair on the latter part, however, is of no great breadth, and its outer margin is usually straight and well defined. Over the tibia the interfemoral fur passes but to a trifling extent, and in many specimens that limb constitutes its exact boundary. In the species last described, the fur usually passes over it, and occupies a considerable space on the base of the wing.

The variations in colour in this species appear to be much less considerable than in the last. The fur of the muzzle, chin, and around the eyes, is black; that of the throat pale buffy-yellow, the line of separation of the latter colour and the black of the chin being pretty distinct. On the forehead the fur is of the same yellowish hue as that of the throat, and on the top of the head it is similarly coloured at its base, but becomes of an umber-brown colour about its middle, and is there tipped with white. This arrangement of colours represents pretty nearly the colour of all the upper parts of the body, excepting that the fur has in addition a dark-coloured

root. The colours may be thus briefly given :—dusky-grey (at the root), yellowish-buff, amber-brown, and finally white. The white is most plentiful on the shoulders, along the middle of the back, and on the rump ; the yellow colour prevails on the head and neck, but becomes less in regular gradation towards the rump, where the brown in great measure takes its place, which it does completely on the interfemoral membrane.

The under surface is nearly similar, but differs in having the colours paler, the yellow less conspicuous, and the tips of the hairs buff-coloured instead of white. On the under parts, as on the upper, the yellowish colour gives way to the brown on approaching the hinder parts, and the hair on the contiguous part of the interfemoral membrane is wholly dark for the greater part of its length, and is tipped with light brown. At the insertion of the humerus is a light-coloured spot. The fur of the sides of the body, under the arms, is of a brownish-buff colour. All the fur on the wing-membranes is buffy-yellow.

The membranes are dark, excepting where there is a growth of hair, such parts being reddish-brown.

Dentition.—In. $\frac{1.1}{6}$; C. $\frac{1.1}{1.1}$; P.M. $\frac{1.1}{2.2}$; M. $\frac{1.1}{3.3} = \frac{12}{16}$.

In the following Table of dimensions, column No. 1 has been taken from a specimen purchased of Mr. J. G. Bell of New York, No. 2 from a specimen in the British Museum, from the United States, and No. 3 from a specimen not quite adult, taken in Bermuda by the Rev. H. B. Tristram, and very kindly forwarded by him for my use.

	No. 1. in. lin.	No. 2. in. lin.	No. 3. in. lin.
Length of the head and body, about ..	3 6	3 10	2 10
— of the tail .....	....	1 10	....
— of the head.....	0 11	....	0 10
— of the ear	0 $4\frac{1}{2}$	....	0 $4\frac{1}{2}$
— of the tragus	0 3	....	0 3
— of the fore-arm	2 3	2 2	2 0
— of the longest finger	4 4	4 0	4 0
— of the fourth finger.....	2 8	2 7	2 4
— of the thumb	0 6	....	0 6
— of the tibia .....	....	0 11	0 9
— of the foot and claws	0 6	0 5	0 $5\frac{1}{2}$
— of the os calcis	0 9	....	0 $7\frac{1}{2}$
Expanse of wings.....	16 6	....	15 6

Hab. North America, not abundant.

Major Le Conte observes, that he has only had the opportunity of examining six or seven examples. The British Museum contains a specimen from California, and another presented by Mr. W. S. MacLeay is labelled South America. Assuming the latter specimen to be correctly labelled, its locality renders it probable that this species, like the last, is distributed over a considerable part of the New

World, and the idea is somewhat strengthened by its occurrence in California and Bermuda.

Major Le Conte has referred this species to the *Vesp. cinereus* of the Catalogue of Peale's Museum, bearing date 1796. There appears to be no doubt that it was to this species that the above name was applied, as the only other North American Bat with which it would be likely to be confounded—*V. noveboracensis*—was clearly distinguished in the Catalogue, and called *V. rubellus*. As I do not know whether any description accompanied the name of *V. cinereus*, I must for the present retain the name given by Say; but in the event of any specific characters having been added in the Catalogue just referred to, the name of *L. cinereus* must of course be adopted.

3. *LASIURUS GRAYI*, n. s.

This species, which I believe is undescribed, is in size a little superior to the larger examples of *L. noveboracensis*, but smaller than *L. pruinus*. To the latter species, however, it bears the greatest resemblance in its forms and general appearance, but differs in several respects, which will be hereafter noticed.

The muzzle is rather obtuse, but less so than in *L. pruinus*. The ears are angular-round, but more pointed than in the last-mentioned species, and have the ear-lobe near the angle of the mouth, more strongly developed. The tragus, although it presents the same general form, yet differs in having the upper or ascending part straight instead of being curved. It is also much narrower at its base.

The thumb has the same long terminal phalange and short basal one observable in the last two species. The feet are large in relation to the size of the animal. The membranes of the wings extend a little way beyond the extremity of the tibia, but *do not reach half-way along the foot*, exclusive of the toes. The extreme tip of the tail is slightly exserted, and very pointed.

The fur of the head extends down the forehead nearly to the nose; the face is moderately hairy, and has a tuft of fine long hairs immediately in front of the eye. The basal part of the hinder surface of the ear is hairy, some of the hair projecting beyond the inner margin so as to be visible from the front. Two patches of short adpressed hair of a fine nature line the inside of the ear, one of them extending from the front margin to near the tip, and the other fringing that part of the margin nearest to the root of the tragus. The latter part is sparingly covered with short adpressed hairs on its exposed surface.

The muzzle and greater part of the face are brownish-black. The fur of the upper parts is of four colours—dark at its root, then yellowish-brown, succeeded by dark brown, and tipped with white. Towards the hinder parts of the body, and on the interfemoral membrane, the yellowish colour gives way to the brown, and the fur is wholly of the latter colour, tipped with white. The throat is light yellowish-brown, passing into dusky-brown on the breast. On all the under

parts the fur is of a faded brown colour for the greater part of its length, but near the tip it becomes a little darker, and is finally tipped with dirty buff colour. The fur on the membranes beneath the humerus is in some examples of the same tricolour as the under parts of the body, but more frequently it is of a uniform brownish-yellow hue, as is that beneath the fore-arm, and that at the base of the fingers.

The hairy portions of the membranes are reddish-brown; the remaining parts very dark brown.

The variations in colour to which this species is subject depend upon the tint of the brown colour near to the tips of the hairs. In one example in the British Museum, this part of the hair is of a light red colour, inclining to pinkish, and takes up a much greater space than usual in each hair, the dusky at the base being there very much reduced. In this specimen the black of the face and the yellowish colour of the throat are scarcely observable; and this, with the red colour, gives it, at first sight, a great resemblance to the *L. noveboracensis*.

The colour of the fur is an index to that of the membranes—in this instance a reddish-brown.

The dentition has not been well examined, but the incisors are similar in number and shape to those of the last two species.

Five examples have been examined in drawing up the above description, and these are all so remarkably uniform in size, that it appears unnecessary to give the dimensions of more than two, those presenting the greatest disparity being selected.

	No. 1.		No. 2.	
	in.	lin.	in.	lin.
Length of the head and body, about ..	3	2	2	3
— of the tail	1	7	1	8
— of the head .....	....		0	9
— of the ears	0	3½	0	3½
— of the tragus	0	3	0	2¾
— of the fore-arm	1	9½	1	9½
— of the longest finger	3	10	3	8
— of the fourth finger.....	2	3	2	1
— of the thumb	0	5½	0	5
— of the tibia	0	8	0	8
— of the foot and claws	0	5	0	4½
— of the os calcis .....	....		0	8
Expanse of wings	14	0	13	9

The dimensions in column No. 1 have been taken from a perfectly adult individual in the British Museum, the locality being unknown. The specimen which has furnished the dimensions in the second column is also full-grown, but nevertheless retains some indications of youth.

Hab. This second specimen was forwarded with another, perfectly

similar, from Chili, by Mr. Bridges. All the other specimens in the British Museum Collection are without authentic habitats.

4. *LASIURUS CAUDATUS*, n. s.

The extreme length of the tail of this species, exceeding that of the head and body, together with the considerable length of the hinder limbs, gives to it a very remarkable appearance, and seems to distinguish it at first sight from all the others of the group.

The muzzle has much the form and proportions of that of *L. noveboracensis*. The ears are obtusely triangular, as broad as high, and have their outer margins brought downwards and forwards along the side of the face to within a little distance of the corners of the mouth, and on the same level with it. Here they terminate, as in all the preceding species, in a separated lobe, in this instance more clearly developed than usual. This part of the ear bears considerable resemblance to the same part in the genus *Molossus*, but is less considerable in degree. The tragus is narrow at its base, from which it rapidly expands, and abruptly bending inwards, leaves an outer angle and curves to an obtuse point. It differs chiefly from the same part in *L. pruinus* in having a more decided inward direction.

The wing-membranes barely extend to the base of the toes. The tail is longer than the head and body.

The fur of the forehead extends uninterruptedly in the direction of the nose, and approaches it nearly. As in all the preceding species, the other parts of the face are moderately hairy.

The fur of the back encroaches on the membranes of the wings for a distance of about four lines, where it has a clearly defined boundary. That of the under parts extends on to the membrane beneath the humerus, but has no regularly defined margin. Between the fore-arm and the fourth finger, in the angle formed by the two, is a growth of extremely short downy hairs of a yellow colour. The upper parts of the feet are moderately hairy, much less so than is usual in *L. pruinus* and *L. noveboracensis*. On the upper surface of the interfemoral membrane, the fur of the rump extends only for half its length, the remaining half being naked. Its under surface is sparingly clothed with hairs for about one-third of its length, *near to the tail only*; that part of the membrane near to the knees and the end of the tail being quite naked.

The membrane itself is rather thickly marked with transverse dotted lines.

The fur is rather long and silky; that of the whole of the upper parts is of a uniform yellowish-buff colour, brown for a short length in immediate proximity to the skin. Beneath, it is reddish-brown at the base for about a third of its length; the remainder being yellowish-buff.

Dentition.—In. $\frac{1.1}{6}$; C. $\frac{1.1}{1.1}$; P. M. $\frac{1.1}{2.2}$; M. $\frac{3.3}{3.3} = \frac{12}{18}$.

	No. 1. in. lin.	No. 2. in. lin.
Length of the head and body	1 9	2 0
— of the tail	2 0	2 6
— of the head . . . . .	...	0 7½
— of the ears	0 3½	0 3
— of the tragus	0 3	0 3
— of the fore-arm	1 8	1 8
— of the longest finger	3 3	3 6
— of the fourth finger	2 0	2 3
— of the thumb	0 4	0 4½
— of the tibia	0 8½	0 9½
— of the foot and claws . . .	0 3½	0 4
— of the os calcis	0 5	0 6
Expanse of wings	13 0	12 9

Hab. Pernambuco, from which place the specimen was received which furnished the above description, and the dimensions in column No. 1. No. 2 is from a specimen in a bad state in spirit, from Chili, I have met with no other examples than the ones here described.

5. LASIURUS AGA, P. Gerv.

Nycticejus Aga, P. Gerv. in Castelnau, Expéd. dans les parties centrales de l'Amérique du Sud, &c., livr. 16. p. 73, 1855.

The following description is taken from that by the original describer.

Ears subround; tragus in the form of a hooked knife ("à peu près de la forme d'une *serpette*"). The nostrils are subtubular, pierced in the sides of the small nose, which is a little emarginate in the centre.

Tail, in the two specimens examined, absent, having been withdrawn from the membrane, in which a median furrow is left in its stead, from the inspection of which it may be inferred that the tail occupied the whole length of the membrane (as in the other species of this group).

The upper surface of the interfemoral membrane has some hairs on its base, as in many species of the genus *Vespertilio*; and its under surface bears some transverse lines of small follicles.

The general colour of the fur is buffy-chestnut, glossy above, and paler beneath.

	in. lin.
Length of the body	2 4 (English).
Interfemoral membrane along its central line. .	1 9
Fore-arm	1 7
Tibia	0 9

I now give a description of a specimen evidently of this species collected at Ega, on the Amazon, by Mr. Bates, and labelled by him "houses, Ega." As it appears to be in a better state of preservation than the two obtained from the same place by M. Castelnau, I am

able, besides confirming the accuracy of his description, to give a more detailed scale of dimensions than he has given.

It is desirable to note, that this specimen, although probably full-grown, yet exhibits some slight indications of non-maturity.

The muzzle is a little longer relatively than in the species I have before described, and is about as much pointed as in *L. noveboracensis*. The end of the nose is small; the nostrils somewhat tubular, with a distinct notch between them.

The ears are triangular-round, and somewhat more pointed than those of any other species here described. The tragus is similarly formed to that part in *L. pruinus*.

The wing-membranes barely extend to the base of the toes, and the extreme tip of the tail is exerted.

The fur of the forehead does not approach so nearly to the nose in this species as in the others of the group.

The basal half of the superior surface of the interfemoral membrane is hairy, but the hair does not reach laterally over the tibia. Beneath, it is sparingly hairy at the root of the tail only. The membranes of the wings contiguous to the body, both above and below, are hairy, more especially on their under surface, where the hair reaches to the elbow, but does not follow the fore-arm.

On all the upper parts the fur is yellowish-buff, the hairs slightly tipped with brownish, and on the under parts uniform yellowish-buff.

Membranes of the wings darkish brown, the interfemoral membrane being paler and marked with about twenty transverse dotted lines.

	in.	lin.
Length of the head and body, about ..	2	0
— of the tail	1	7
— of the head	0	8
— of the ears	0	3½
— of the tragus	0	2½
— of the fore-arm	1	7
— of the longest finger	2	7½
— of the fourth finger	1	10
— of the thumb	0	4
— of the tibia	0	8½
— of the foot and claws	0	5½
— of the os calcis	0	8
Expanse of wings	11	6

In colour this species very closely resembles the last, but, besides many minor points of distinction, the great length of the tail in the former will at once be sufficiently distinctive.

I have now described all the species that I am able with certainty to refer to this group; but there are two others described by Major Le Conte in the 'Journal of the Academy of Natural Sciences of Philadelphia' for 1855, characterized by the same formula of denti-

tion as in *Lasiurus*, but which appear nevertheless to have the other parts as in the more ordinary Bats.

One of these—*Vesp. pallidus*, Le Conte, — the writer says, has only four incisors in the lower jaw,—altogether an anomalous character, if not due to some accidental cause.

The other species is the *Vesp. crepuscularis* of the same naturalist (*V. creeks*, F. Cuv.), which, while possessing only two upper incisors, precisely as in *Lasiurus*, has yet all the other characters similar to those of *Vesp. Carolinensis*,—a species clearly appertaining to that division of the genus *Scotophilus* which constitutes Section *b.* of the genus *Vesperugo* of MM. Keyserling and Blasius.

It would appear from this that the number and form of the incisors in the upper jaw do not furnish a very valuable generic character; and when we find another species from India, not only different in its forms from *Lasiurus* and *Nycticejus* (so called), but also differing from the above-mentioned *Vesp. crepuscularis* in all respects save in the upper incisors, which are similar, we are quite justified in regarding this as a character of subordinate value in the arrangement of this difficult group of animals.

The Indian species to which I allude is referable, as far as external form is concerned, to that section of the genus *Vespertilio* which has been called *Cappacinius* by Prince Charles Lucien Bonaparte, and *Trilatitius* by Dr. Gray. It is closely affined to the *Vesp. Tasmannensis* of the latter zoologist, and may perhaps prove identical with it.

Besides the species given in this Monograph, there are several others differing materially from them, and from each other, but which have the tail-membrane hairy. As instances, may be cited *Vesp. noctivagans*, Le Conte (*V. pulverulentus*, Temm.), *Lasiurus Pearsonii*, Horsf.* (closely affined to the *Vesp. emarginatus* of the continent of Europe), and *Vesp. suillus*, Temm., called *Murina suillus* by Dr. Gray, and *Noctilinia Lasyura* by Mr. Hodgson.

From this it must be evident that this character is only of generic value when associated with others of greater constancy, and it is only by the characters taken collectively that the groups can be truthfully defined.

The form of the head, the muzzle, and the nostrils, of the ears and the tragi, the extent of the membrane in reference to the hinder extremities, the quality and distribution of the fur, the number and form of the upper incisors, and more than all, the general conformation of the cranium, supply the means by which the *Lasiuri* may be recognized and associated.

* In alluding to this species, I may mention, that it is the *Vesp. emarginatus* of continental writers to which I refer,—a well-marked species very similar in appearance to *Lasiurus Pearsonii*, but not more than half the size, and with less hair on the interfemoral membrane. The so-called British species is, I believe, no other than *Vesp. mystacinus*.

Mr. Tegetmeier exhibited a collection of skins of new varieties of domestic Fowls, the property of Mr. C. Darwin.

Those from the Madras Presidency were chiefly of the Malay type, more or less resembling the gigantic Kulm Fowls that were imported some years since by Colonel Sykes, and which were formerly in the possession of the Society. The Fowls from Singapore were remarkable for the recurved character of the plumage. The interior of Persia furnished a very beautiful steel-black variety, perfectly distinct from any known in this country, and which was stated to be the Common Fowl of the district. Good specimens of the black-skinned, white silky-plumaged Fowl with black periosteum were forwarded both from Singapore and Madras. Mr. Tegetmeier called attention to the fact, that all the specimens shown differed in a much greater degree, than our common English Game Fowls, from the *Gallus Bankiva*, so frequently asserted to be the origin of our domesticated species of the genus *Gallus*.

March 10, 1857.

Dr. Gray, F.R.S., in the Chair.

The following papers were read :—

1. CHARACTERS OF SOME APPARENTLY NEW SPECIES OF AMERICAN ANT-THRUSHES. BY PHILIP LUTLEY SCLATER, M.A., F.L.S., &c.

1. FORMICARIUS TRIVITTATUS.

Supra fusco-cinnamomeus, subtus clarior, gula pallidior: alis caudaque nigris cinnamomeo tinctis, illarum tectricibus minoribus et majoribus fascia terminali et remigibus ipsis fascia mediali alba præditis, itaque alis trifasciatis: oculorum ambitu seminudo: rostro et pedibus nigris.

Long. tota 7·0, alæ 3·4, caudæ 2·5.

Hab. In ripis fl. Amazonum.

Mus. Brit.

The only individual of this species which I have yet seen is that in the British Museum. It is easily recognizable among its congeners by its thrice-banded wings. I am now acquainted with seven birds which I consider to be probable members of this genus, viz.—(1.) CAYANENSIS, Bodd. ex. Pl. Enl. 821 (*colma*, Gm. et Bodd., *tetema*, Licht., *fuscicapilla*, Vieill., *ruficeps*, Spix), ex Guiana et Brasilia. (2.) ANALIS (Lafr. et d'Orb.), Voy. d. l'Am. MÉR. Ois.

pl. 6*. f. 1, ex Bolivia, Cayenna et ins. Trinitatis. (3.) *NIGRIFRONS*, Gould, P. Z. S. 1855, p. 68, ex Nov. Grenada et fl. Amazon. (4.) *MONILIGER*, Sclater, P. Z. S. 1856, p. 294, ex Mexico. (5.) *TRIVITTATUS*. (6.) *ERYTHROPTERUS*, Gould, P. Z. S. 1855, p. 69. (7.) *NIGROMACULATUS* (Lafr. et d'Orb.), Voy. d. l'Am. MÉR. pl. 6*. f. 2, ex Bolivia et fl. Amazon, sup.

The last three birds have the space round the eyes more or less denuded, and would form the subgenus *Phlegopsis*, Reichb., of which, I believe, *F. nigromaculatus* is the type. In that very peculiar member of this family *Pyriglena nudiceps* (*Myiothera nudiceps*, Cassin, Pr. Ac. Sc. Phil. v. p. 106. pl. 6), this formation is developed to a still greater extent, the whole top of the head being naked.

2. *CONOPOPHAGA CASTANEICEPS*.

Conopophaga ardesiaca, Tsch. Faun. Per. p. 179, et Sclater in P. Z. S. 1855, p. 145, nec Lafr. et d'Orb.

Supra olivascenti-brunnea ; pileo castaneo, frontem versus lætiore : lateribus capitis et gula nigricanti-cinereis : penicilla postoculari alba : subtus cinerea, abdomine medio albescentiore : lateribus olivaceo indutis : mandibula superiore nigra, inferiore flava, pedibus brunneis.

Long. tota 4·4, alæ 2·9, caudæ 2·7.

Hab. In Nova Grenada, Bogota et in Peruvia Orientali (*Tsch.*).

Mus. Brit. et P. L. S.

This is a typical *Conopophaga*, with the characteristic white pencil of feathers on the sides of the head. Trusting to Tschudi's identification of a specimen collected by him, which is now in my collection, I had considered it to be d'Orbigny's *C. ardesiaca*. But upon examining the type of that species in the French National Collection I found such was not the case. That bird does not possess the chestnut-brown cap or darker cinereous colour of the throat belonging to the present species, but is more uniform in its colouring both above and below.

There is a specimen of this bird in the British Museum from Bogota.

M. O. des Murs, in the Ornithology of the Voyage of Castelnau and Deville, has described and figured another *Conopophaga*, somewhat resembling the present *C. peruviana*, pl. 16. f. 1. But this bird has spots upon the wings and a varied back.

3. *HYPOCNEMIS ELEGANS*.

Hypocnemis — ?, Sclater, P. Z. S. 1855, p. 147.

I have lately seen other specimens of this bird, and have one in my own collection—a Bogota skin. Though closely allied to *H. melanosticta*, I cannot consider it otherwise than specifically distinct, and therefore propose a name for it: I have already given its characters in these Proceedings for 1855.

4. MYRMECIZA HEMIMELÆNA.

♂. *Castaneus: dorsi medii pennis basi albis, inde nigris, apice castaneis: capite toto undique et corpore subtus ad medium pectus nigris: ventre medio albido: campterio summo et maculis tectricum alarium apicalibus albis: rostro nigro, pedibus flavis: cauda rufo-castanea unicolore.*

♀. *Obscure olivacea rufo tincta: interscapulii pennis basi albis: dorso postico, alis et cauda rufis: alarum tectricibus nigris, sicut in mari albo aut fulvescenti-albo guttatis: subtus læte ferruginea, pectore et ventre medio pallidioribus: lateribus et crisso rufescenti-olivaceis.*

Long. tota 5·0, alæ 2·4, caudæ 1·7.

Hab. In Bolivia (Bridges).

Mus. Brit.

There are single specimens of both sexes of this bird in the British Museum, which are the only examples I have yet seen. It may be best arranged near *Myrmeciza loricata*, the type of the genus, with which it agrees generally in form, although the tail is comparatively much shorter.

5. FORMICIVORA HÆMATONOTA.

Supra brunnea, dorso medio rubro, hoc colore uropygium versus dilutius: alarum tectricibus nigris, omnibus macula terminali pallide cervina præditis, secundariarum externarum apicibus eodem colore obsolete terminatis: subtus cinerea, gula nigra maculis triangularibus albis aspersa: ventris lateribus et crisso pallide brunneis: cauda unicolore brunnea: rostro nigro, pedibus brunneis.

Long. tota 4·0, alæ 2·0, caudæ 1·2.

Hab. Chamicurros in ripis fl. Huallaga in Peruv. Orient. (Hauzwell).

Mus. Brit.

Obs. Similis *F. gulari* (Spix, Av. Bras. ii. t. 41. f. 2) sed dorso medio rubro nec cinnamomeo, et colore subtus dilutius cinereo dignoscenda.

2. ON THE SPECIES OF CROCODILUS INHABITING THE RIVERS KWÓRA AND BÍNUË (NIGER AND TSADDA) IN CENTRAL AFRICA. BY DR. BALFOUR BAIKIE, F.R.Geog.S. &c.

Among the Zoological collection which I made during my visit to the rivers Kwóra and Bínuë in 1854, were several skulls of Crocodiles, varying in length from 14 to 26 inches. A careful comparative examination of these shows them all to be possessed of similar characters; but on attempting to refer them specifically, I have experienced considerable difficulty, their proportional measurements not agreeing with any hitherto described. Two African species of *Crocodilus* are already known,—*C. vulgaris*, the Nilotic or Egyptian

Crocodile, and *C. marginatus* of Southern Africa. Of these, according to the best recent authority, namely Dr. Gray, the characters are,—

C. vulgaris.—"Head elongate, triangular, flat, smoothish above, narrow, tapering at the sides, nearly twice as long as the width of the head behind; muzzle at the notch nearly two-thirds the width of the forehead, at the ninth tooth as wide as half the distance between the eyes and nostrils; forehead flat, with nearly parallel sides."

C. marginatus.—"Head elongate, triangular, rather convex, rounded, sides slightly swollen behind the notch, half as long again as the width of the head behind; muzzle at the first notch as wide as the forehead, and at the ninth tooth as wide as two-thirds the distance between the eyes and nostrils; forehead deeply concave, with the sides high, prominent and nearly parallel; dorsal plates very strongly keeled."

I shall now describe generally the skulls which I brought home, giving the measurements of four of them; from which it will be seen, that while in various prominent points they more resemble the latter, yet in proportional measurements they approach more nearly to, while not altogether agreeing with, *C. vulgaris*, thus showing that in many characters they are intermediate, and thus either lowering these two into mere varieties, or what is, I believe, more probable, establishing for themselves specific characters.

"Head elongate, oblong, somewhat triangular, rather convex, especially posteriorly, rounded, upper surface rough, sides distinctly swollen behind the notch; length more than twice the width of head behind; forehead slightly concave, sides not prominent, converging anteriorly; muzzle at notch nearly two-thirds the greatest width of forehead; at the ninth tooth more than two-thirds the distance between the eye and nostrils."

Measurements.

	No. 1. in.	No. 2. in.	No. 3. in.	No. 4. in.
Extreme length	26	24 $\frac{1}{3}$	22 $\frac{1}{2}$	21
Greatest width behind.....	12 $\frac{3}{4}$	12	11 $\frac{1}{8}$	10 $\frac{1}{4}$
Distance from eye to nostril..	10 $\frac{3}{4}$	10	9	8 $\frac{3}{4}$
Breadth at ninth tooth.....	7 $\frac{3}{4}$	6 $\frac{1}{2}$	6 $\frac{1}{4}$	5 $\frac{3}{4}$
Breadth at notch.....	4 $\frac{1}{4}$	3 $\frac{3}{8}$	3 $\frac{5}{8}$	2 $\frac{3}{4}$
Width of forehead, anteriorly.	5	4 $\frac{1}{2}$	4 $\frac{1}{8}$	4
Width of forehead, posteriorly	6 $\frac{1}{2}$	5 $\frac{3}{4}$	5 $\frac{1}{4}$	5
Extreme length of lower jaw ..	29	27	24 $\frac{1}{2}$	—

The proportions of all these correspond almost exactly, and I have ascertained the proportional measurements of a smaller one to be the same, although from its being in pieces and not yet put together, I have not time to take the exact dimensions. They show the Crocodile from the Bínúë to be proportionally longer than *C. vulgaris*, and much more so than *C. marginatus*, to be in form of upper surface and of forehead near the latter, but without the prominent sides to

the forehead,—also in breadth at the ninth tooth to agree with *C. marginatus*, while the converging shape of the forehead differs from both.

I shall add some few other general characters derived from these skulls:—Cranial fossæ somewhat oblong and ear-shaped, converging anteriorly, and almost touching by their inner and anterior margins, the outer side being nearly straight. Orbits with a slight notch anteriorly. Nasal foramen broadly pyriform, and almost quadrilateral. Foramina for the two anterior teeth converted in old specimens into deep notches. Articulating extremities of lower jaw much curved inwards.

I have compared these skulls with twelve others of Indian and American species, from all of which they are quite distinct.

The ninth upper tooth of Crocodiles is said to be enlarged like a canine, but this is not strictly correct. I have examined the dentition in eighteen skulls of various species; in the lower jaw there are always nineteen teeth, but in the upper jaw the number in the adult is seventeen on either side, while in the young it is eighteen. This is owing to the second incisor being deciduous, and in old skulls the socket is completely obliterated by the enlargement of foramen for the two anterior teeth. Thus in old animals there are only four teeth in each intermaxillary bone, while in younger individuals there are always five. So, more strictly, it is the tenth and not the ninth upper tooth which is enlarged.

The characters which I have above enumerated seem to me distinctive, and possibly on further investigation, when the entire animal is examined, and its external characteristics determined, it may prove a new species. The Crocodiles which I saw on the mud banks, or swimming about in the river, appeared of a dark green colour. Adanson mentions two apparently from the upper parts of the Niger, which he distinguished—"Crocodile vert du Niger" and "Crocodile noir du Niger." Whether either of these resembles my specimens I have no means of ascertaining; but Cuvier speaks of African Crocodiles "qui ont la tête un peu plus allongée à proportion de sa largeur," though he adds, "et un peu plus plate, ou plutôt moins inégale, à sa surface." If this prove to be separate I would suggest for it the specific designation *C. Binuensis*, from the name of the river whence I obtained the specimens.

3. DESCRIPTIONS OF FOUR UNDESCRIBED SPECIES OF BATS. BY ROBERT F. TOMES.

1. SCOTOPHILUS PACHYOMUS, n. s.

Muzzle rather obtuse; ears ovoid; tragus short, of nearly uniform breadth, and round at the end. Wing-membranes extending to the base of the toes. Fur bicoloured. Size rather larger than S. noctula.

This species appertains to the same division of the genus as *S.*

pipistrellus, *S. Kuhlii*, *S. marginatus*, *S. minutus*, and perhaps *S. Carolinensis*; but it is to the *S. discolor* of Europe that it bears the greatest apparent resemblance, owing in some measure to the similarity in the quality and colour of the fur.

In size it little exceeds the Noctule Bat, being much the largest species of the restricted group to which it belongs.

The muzzle is somewhat obtuse, the nostrils rather prominent, and opening sublaterally. The ears are rather long, ovoid, and narrowed towards their tips. The tragus is scarcely half the length of the ear, of nearly uniform breadth, round at the end, and slightly curved towards the head.

The wing-membranes extend to the base of the toes; the latter are a little longer than the remaining portion of the foot.

The face is moderately hairy; on the top of the nose, and about the muzzle nearly naked, but with a slight group of hairs on the gland of the upper lip, which extends to the angle of the mouth.

The fur is markedly and singularly bicoloured, very much resembling that of *S. discolor*. That of the upper parts is of a dark brown, conspicuously tipped with whitish brown. Beneath, it is brown at its base, with the terminal half yellowish brown.

The upper incisors are four in number, in pairs, of nearly uniform size, separated from the canines by an interval on each side, and with an interval in the middle, of very moderate extent.

Length of the head and body.....	2	6
—— of the tail	1	10
—— of the head.....	0	9
—— of the fore-arm	2	1
—— of the longest finger	3	9
—— of the fourth finger	2	7
—— of the tibia.....	0	10
—— of the foot and claws.....	0	5½
Expanse of wings	13	6

Hab. India. In British Museum, collected by Capt. Boys.

2. SCOTOPHILUS PUMILOIDES, n. s.

Muzzle tumid; ears small, broadly ovoid, not emarginate, with their tips directed a little outwards. Tragus of nearly uniform breadth, round at the end, and curved inwards. Wing-membranes extending to the base of the toes.

In its general character this species bears considerable resemblance to the smaller Australian species of Bats, such as *S. picatus*, Gould, *S. Greyii*, Gray, and *S. pumilus*, Gray, all having the forms of the *S. pipistrellus* of Europe, with some slight modifications. As its name indicates, it is most closely affined to *S. pumilus*, but it differs from it in being somewhat larger.

The muzzle is short and rather tumid; the nostrils and lips present no variation from what is usual in the restricted group to which

the species belongs, being in fact similar to the same parts in the common *Pipistrelle*.

The ears are small and very short, being scarcely longer than wide, and are of a tolerably regular ovoid form, but with their extreme tips brought to a blunt angle directed somewhat outwards.

The tragus is about half the length of the ear, of nearly uniform breadth, with a rounded tip, and a slight inward curvature.

As in all the species above enumerated, the wing-membranes extend as far as the base of the toes. The extreme tip of the tail is exserted, and the interfemoral membrane is marked with twelve transverse dotted lines.

The fur of the whole of the body is very thick and close, that of the back extending on to the interfemoral membrane for nearly a fourth of its length. In one example, the fur of the pubes also extends on to the membrane around the root of the tail; but this appears to be an exception.

On all the upper parts the fur is bicoloured, dark at its root, with the terminal third yellowish-brown; beneath it is similar, but the tips are pale brown with a slight olive-yellow cast, which is most conspicuous on the pubes and flanks.

The cutaneous system is of a medium brown colour.

The dentition has not been examined.

Length of the head and body	1	6	1	6
— of the tail	1	0	1	3
— of the head, about	0	7	0	6½
— of the ears	0	3½		
— of the tragus	0	2		
— of the fore-arm	1	3¼	1	3
— of the longest finger	2	4	2	3
— of the fourth finger	1	9	1	9
— of the thumb, about	0	2½		
— of the tibia	0	6	0	5¼
— of the foot and claws	0	3¼	0	3½
Expanse of wings	9	0	9	3

Hab. China.

3. VESPERTILIO CHINENSIS, n. s.

Top of the head very slightly elevated; muzzle rather thick; ears narrow, ovoid; tragus narrow, nearly straight and pointed; wing-membranes extending to the base of the toes; toes longer than the remaining portion of the foot.

In its general forms this species bears considerable resemblance to *V. murinus* of Europe, but the ears are much narrower. It is also somewhat larger; and if we except the *V. maximus* from South America, is the largest true *Vespertilio* known*.

* The specimens of *V. murinus* that I have made use of for comparison with this species, have been received from various parts of the continent of Europe, from

The top of the head is elevated only to a very moderate extent, and the face is rather long and thick. The nostrils are slightly tubular, and open sublaterally. The ears are of a longish oval form, not emarginate, but narrowed towards the tips. They bear greater resemblance to those of *V. Nattereri* than to those of any other species with which I am acquainted, but are relatively more narrow towards the ends. The tragus is narrowish at its base, from which it expands to near its middle, which is the widest part. From this it tapers to an acute point, having a slight inward tendency.

The wing-membranes extend to the base of the toes, and the latter are longer than the remaining part of the foot, just as in *V. murinus* and *V. formosa*, Hodgs.

The forehead is hairy, and the hair extends nearly to the end of the nose. On the upper lip is a thick moustache, the space around the eye being the only part of the face which is naked.

The fur is longish, fine in texture, and rather cottony, but not very thick. It does not anywhere encroach on the membranes.

All the upper parts are very dark brown, with the extreme tips of the hairs a little paler. Beneath, nearly similar, but the tips of the hairs are pale grey-brown on the breast and belly, whilst the sides of the body and pubal region are almost black.

The membranes are very dark.

Length of the head and body, about	3	9
— of the tail	2	2
— of the head	1	0
— of the ears	0	8
— of the tragus	0	3½
— of the fore-arm	2	5½ or 6
— of the longest finger	4	0
— of the fourth finger	2	3
— of the thumb	0	6 or 6½
— of the tibia	1	1
— of the foot and claws	0	7
Expanse of wings, about	16	0

Hab. China, collected by Mr. Fortune.

4. VESPERTILIO BLYTHII, n. s.

Ears ovoid, somewhat pointed, their ends sloping outwards.

Tragus narrow and tapering to a subacute point. Crown moderately elevated. Feet large, wholly disengaged from the wing-membranes.

In form and proportion this species resembles *Vesp. macropus*, Gould, from Australia, and in colour is somewhat like *V. ferrugineus*, Temm., from South America, both having the same subgeneric cha-

Algeria, and from Nubia. Those from Switzerland are the only ones that appear to approach it in size; but even they, although perfectly adult, are decidedly smaller, whilst the species I am describing presents indications of youth in the imperfectly ossified condition of the finger-joints.

acters as *V. Hasseltii*, *V. Carolii*, *V. Daubentonii*, and *V. dasy-*
cnemus.

To the restricted group of which the above are representatives, Prince C. L. Bonaparte has given the name of *Cappacinius*, whilst Dr. Gray distinguishes it by the name of *Trilatitius*.

The crown is moderately elevated, and the snout is of medium length and substance. The ears are oval, somewhat pointed, and have their tips directed a little outwards. The tragus is narrow, and tapers evenly to a subacute point, which has a very slight outward tendency.

The wing-membranes extend only to the distal extremity of the tibia, leaving the feet wholly disengaged. The latter are large, and have the toes longer than the remaining part of the foot.

On the interfemoral membrane may be observed about eight strongly marked transverse lines. The tip of the tail is free for the length of its terminal joint.

The wings are ample and broad, as the length of the fingers relatively to each other, and to the other dimensions, as given below, will testify.

The fur of the forehead approaches to near the end of the nose, but around the eyes the face is nearly naked, and the upper lip is destitute of a moustache. All the membranes are naked.

The fur is long, rather soft, and inclining to silky on the upper parts. On the whole of the upper surface of the body it is dark brown at the root, with its terminal half cinnamon-brown, brightest on the rump, and tinged with grey on the head and neck. Beneath it is dark at its base, with its terminal half brownish-white. Both above and beneath, the bicoloured character of the fur is conspicuous, and, as already mentioned, bears some resemblance in this respect to that of *V. ferrugineus*.

Length of the head and body, about	....	2	3
— of the tail	.....	1	9 or 10
— of the head	.....	0	10?
— of the ears	.....	0	7½
— of the tragus	.....	0	4
— of the fore-arm	.....	2	2 or 3
— of the longest finger	.....	3	10
— of the fourth finger	.....	3	0
— of the thumb	.....	0	5
— of the tibia	.....	0	11
— of the foot and claws	.....	0	6½
Expanse of wings	.....	15	0

Hab. A single specimen in the British Museum Collection is labelled "India, Nassenabad, from Mr. Warwick, 1848," and, I believe, was collected by Capt. Boys.

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NEST AND EGGS OF COMBYCILLA GERRILLA, TENN.

March 24, 1857.

Dr. Gray, F.R.S., in the Chair.

The following papers were read :—

1. ON THE NEST AND EGGS OF THE WAXWING (*BOMBYCILLA GARRULA*, TEMM.). BY JOHN WOLLEY, JUN., ESQ.

(Aves, Pl. CXXII.)

The Waxwing, as observed in Lapland, makes a good-sized and substantial nest, but without much indication of advanced art. It is of some depth, and regularly shaped, though built of rather intrac-table materials. As in those of many other birds in the Arctic forests, the main substance is of the kind of lichen commonly called tree-hair, which hangs so abundantly from the branches of almost every tree. This lichen somewhat resembles a mass of delicate root-lets, or perhaps may be compared to coarse brown wool ; but some of it is whitish, and in one nest there is a little of this mixed with the ordinary brown or black. This main substance of the nest is strengthened below by a platform of dead twigs, and higher up to-wards the interior by a greater or less amount of flowering stalks of grass, and occasionally pieces of equisetum. It is also interspersed with a little rein-deer lichen, perhaps a sprig or two of green moss, and even some pieces of willow cotton. There may also be observed a little of the very fine silvery-looking fibre of grass leaves which probably have been reduced to that condition by long soaking in water. In one of the nests examined there were several pen-feathers of small birds as an apology for a lining. Of other nests which are to be found in the same forest, it most resembles, but is considerably less, than that of the Siberian Jay, which however is less securely put together, but has many more feathers and soft materials for a lining.

The nest of the Waxwing is built on the branch of a tree, not near the bole, and rather, as one of the observers has said, standing up from the branch like a Fieldfare's or other Thrush's nest, than supported by twigs touching it at the sides, as the nests of many birds are supported. Of six nests, four were in small Spruces, one in a good-sized Scotch fir, and one in a Birch—all placed at a height of from 6 to 12 feet above the ground. The tree in several instances was unhealthy, thin and scraggy in its branches, to which there hung a good deal of hair lichen ; and the nest seems generally much ex-posed, though from its resemblance to the lichen hanging near, it might escape the eye. The nests found were in parts of the forest considerably open, once or twice on the side of low hills, near a river, or with an undergrowth of dwarf swamp-loving shrubs. But at present we have scarcely enough examples to show that there is a preference for any particular kind of ground.

Five seems to be the ordinary number of eggs ; in one nest only

there were as many as six. They have a pale salmon(?) -coloured ground, upon which are distributed pretty equally good-sized purple spots, some with more and some with less deep colour, but nearly all of them having a shade or penumbra, such as is common especially in eggs of the Chaffinch. The only very marked variety I have yet seen, has short streaks and much smaller and more numerous spots than usual, of which markings a considerable proportion are of a pale yellowish-brown. The eggs may be about an inch in length, but hardly enough have been obtained to determine the average dimensions. Marked differences in size in the eggs of the same nest have not yet been observed; but, as with other birds, we find that one nest may have all its eggs considerably larger than those of another nest.

In the backward and cold spring of 1856, Waxwings had their full complement of eggs about the 12th of June.

The writer abstains for the present from offering any remarks on the distribution of this bird in the breeding season, hoping that upon this subject, as upon the habits of the Waxwing in the summer, he may hereafter have some more complete observations to communicate.

YOUNG OF THE WAXWING.

A young bird caught on the 5th of August, as it fluttered from the nest, had a general resemblance to the adult, though all the colours were more dull. The wax-like ends to the wing-feathers, the yellow tip to the tail, the black patch between the eye and the beak are all there, whilst the rich mahogany of the under tail-coverts is of a quieter brown; the blooming vinous colour of the head and back has not yet emerged from a homely neutral, and the crest is but just indicated by the longish feathers of the crown. The most marked difference between the adult and young is in the throat and under surface generally. There is at present scarcely a trace of the deep black patch of the chin, and the delicate tint of the general under surface of the adult is replaced by mottled neutral and white. This upon examination is found to owe its appearance to those longer webs, which arising towards the root of each feather, extend as far outwards as the webs which arise nearer its tip, being very pale or white, and thus relieving, on both sides, the last mentioned darker webs.

LAPLAND OWL. *Strix lapponica*, Temm.

Two nests of the Lap Owl were found in Finnish Lapland in 1856. In one near Sodankyla there were two eggs, and when one of the birds was shot, a third egg was found ready for exclusion. They were placed on the jagged end of the stump of a large Scotch fir, about 12 feet from the ground, at which spot the tree had been snapped across by some storm, the upper part not yet entirely separated, but sloping downwards till the greater part of its weight was supported by the ground.

The other nest was near the Aunasjoki, at the top of a lowish Scotch fir. Some time previously in the same year a bird had

been shot at this spot, which was found to be a female with eggs inside. The nest was not observed until after the shot was fired. At the second visit on the 28th of May, there were two eggs in the nest, and again a bird was shot, which turned out to be a new female with a fully-formed egg inside, through which the bullet had passed. The skin is now in England. The birds seemed on both occasions remarkably fearless.

The eggs are smoother, and, as might be expected, considerably smaller than those of the Eagle Owl. The dimensions of the two in the last-mentioned nest are 2 in. \times 1.6 in. and 2.1 in. \times 1.65 in.

At the meeting of Scandinavian naturalists in Christiania last summer, before I heard of these two nests having been found, I was able to announce that the Lap Owl generally makes its nest on the top of a stump. I had received several reliable accounts from different woodsmen, but had never found a nest myself, or been able to get the eggs, which indeed have, I believe, hitherto been unknown to ornithologists. It appears that three is the ordinary number of eggs.

TENGMALM'S OWL. *Strix Tengmalmi*, Gmel.,

lays its eggs in holes of trees and occasionally in egg-boxes. When once established it cannot easily be made to leave its quarters, and it can, as it is said, keep possession against a much larger bird; yet from the present nest (the only one I have had the good fortune to meet with), after having laid four eggs, the mother was ejected by a Golden Eye. The dimensions of the egg accompanying this paper are 1.32 in. \times 1.05.

Muoniovara, February 2nd, 1857.

2. ON THE SKULL OF A SPECIES OF *MECISTOPS* INHABITING THE RIVER BÍNUË OR TSÁDDA, IN CENTRAL AFRICA.

BY DR. BALFOUR BAIKIE, F.R.Geogr.S., ETC.

The genus *Mecistops*, from the fewness of its numbers and the retired localities which it inhabits, is but little known, scarcely any mention of it being found in zoological writings. It was first distinguished as a species of *Crocodilus* by Cuvier, from a specimen still preserved in the Museum of the Royal College of Surgeons in London, and which he named *C. cataphractus*. Since that time two other species have been described, *M. Bennettii* or *M. leptorhynchus* from Western Africa, and *M. Journei*, said to be from New Guinea. With the exception of this latter species it is quite an African genus, inhabiting the various rivers falling into the Atlantic. In the 'Proceedings of the Zoological Society' for 1835, p. 128, the *C. leptorhynchus* of Bennett is said to have come from Fernando Po; but I should think that this, except established on undoubted authority, must be incorrect, chiefly because in that island the physical conditions requisite for its existence are wanting. Fernando Po is a small volcanic island, totally without the muddy rivers delighted in by

Crocodylidae, and possessing nothing beyond streams which, during the rainy season, are tumultuous mountain torrents with rocky beds. It is much more likely that the specimen alluded to was obtained from some of the numerous rivers opening into the Bight of Biafra, opposite to Fernando Po, and that it came to England *vid* Fernando Po, that island being a common point of call for vessels on their way home.

In August 1854, while at the town of Ojogo on the river Bínuë, my assistant procured from a native the skull of a *Mecistops*; and as this was the only occasion on which I met with its remains, and as I never saw one in the river, I conclude that it is there a comparatively scarce species. I have since described the animal to Dr. Barth, who informs me that during his lengthened wanderings he never remembers to have met with it. Crocodiles again were everywhere to be seen, and in many places most abundant.

The skull seems from its appearance to be that of an adult animal. Its extreme length is $22\frac{1}{4}$ inches, the greatest breadth being $9\frac{1}{4}$ inches, or nearly in the proportion of $2\frac{1}{2}$ to 1. From this it may be inferred to be most probably *M. cataphractus*, that being the proportion of the length to the breadth in that species, while in *M. Bennettii* (if distinct) it is said to be as 3 to 1. It has seventeen alveolar sockets on each side of the upper jaw, and fifteen in the lower, in which particulars it agrees with the characters originally given by Cuvier in the 'Ossemens Fossiles,' "la longueur de sa tête étant comprise deux fois et demie dans sa largeur," * * * "On lui compte dix sept dents de chaque côté à la mâchoire supérieure et quinze à l'inférieure," 4 ed. tom. ix. p. 116. In each are intermaxillary sockets; but for various reasons I am inclined to believe that this is the case only in the adult, and that in the young animal there are five intermaxillary teeth on each side. The ninth remaining upper tooth is the most prominent, and it is distant from the extremity of the snout $7\frac{1}{2}$ inches.

In all essentials the skull of the *Mecistops* shows it to be properly a member of the family *Crocodylidae* rather than the *Gavialidae*. The teeth are irregular, the sides of the jaws are not parallel, there is a distinct swelling opposite the ninth remaining upper molar, and the lower canines are received in notches in the upper jaw.

The skull is considerably depressed, much produced anteriorly, and the extremity of the snout somewhat enlarged. Upper surface smooth. Forehead nearly flat, pitted, sides not raised, converging anteriorly. Cranial fossæ nearly circular, resembling those of the Gavial. Orbits rather more convergent than in the Crocodiles, and the nasal aperture more circular. Nasal bones more prolonged than in *Gavialis*, yet not reaching, as in the *Crocodyli*, the nasal opening, but distant from it an inch and a half. Anterior spine of middle-frontal very long, slender, tapering, and pointed. Lacrymal bones lengthened and narrow. Notch for lower canines about an inch beyond posterior edge of nasal foramen, and about half an inch from the anterior extremity of the nasal bones. Anterior palatine foramen small. Palatine bones tapering and pointed anteriorly.

Extreme length of lower jaw $24\frac{1}{2}$ inches, suture $5\frac{3}{4}$ inches in length, extending to opposite the seventh tooth on each side. Narrowest portion of lower jaw between fifth and sixth teeth, where it does not exceed an inch and three-eighths. Tenth and eleventh teeth nearly equal, the latter being rather the larger, but by no means exceeding the others in the same proportion that it does in *Crocodilus*. Its attenuated snout, narrow jaws, and small teeth would seem to indicate that it lives principally on fish.

Thus while it offers some analogies with the *Gavialidæ*, its true affinities are undoubtedly with the *Crocodilidæ*, though it may be held to represent the former in the African and other rivers which it inhabits.

April 28, 1857.

John Gould, Esq., F.R.S., V.P.Z.S., in the Chair.

The following papers were read :—

1. OBSERVATIONS ON THE SPECIES OF THE GENUS *MANATUS*.
By DR. J. E. GRAY, F.R.S., F.L.S., V.P.Z. & ENT. SOC. ETC.

Dr. Balfour Baikie having requested me to examine the skull of the Manatee from Africa, which he described at a preceding meeting, I am induced to send you the following observations.

There appears to be considerable confusion respecting the nomenclature of the skulls of these animals.

M. Cuvier and De Blainville figure the skeleton and skull of the American Manatee (*M. australis*) from the same specimen sent from Cayenne in the Paris Museum. This animal differs essentially from all the four skulls from the American coast which are in the British Museum Collection, in the great elongation of the front of the lower jaw, and the comparative length and narrowness of the nasal opening. A copy of the front part of Cuvier's figures is given by Dr. Harlan as that of *M. americanus*. On the other hand, the four skulls (two of which come from the West Indies and one from Cuba) in the British Museum all agree with the skull figured by M. Cuvier as the *Lamatin du Sénégal**, and also with that (which is probably from the same specimen as Cuvier's in a more imperfect state) which De Blainville figures under the name of *M. latirostris* of Harlan, in the short rounded form of the front end and the prominence of the gonyx on the under side of the lower jaw, and in the shortness and breadth of the nasal opening; and this appears to be different from the skull which De Blainville figured under the name of *M. Senegalensis*. The skeleton of a young female

* The front part of this figure is copied by Dr. Harlan for comparison with that of his *M. latirostris*.

specimen from Jamaica is figured by Sir Everard Home (Lectures, iv. t. 54), and the head of this skeleton is copied under the name of *M. australis* by Wagner (Saugeth. t. 381. f. 4), and the animal is figured from a drawing by Mr. Gosse in the Figures of Animals published by the Christian Knowledge Society, as the *Manati*.

The more adult of the Museum skulls exactly agree with Dr. Harlan's figures of the skull on which he founded *M. latirostris* from the coast of East Florida.

I am inclined to believe that all the skulls from America in the British Museum, and that of a very young specimen in the same Collection, belong to one species, though they vary considerably in the height of the intermaxillary bones, in the comparative length and breadth of the nasal opening, the extent of the bending down of the front of the upper jaw, the completeness and incompleteness of the orbit, and in the smoothness, roundness, or angularity and rugosity of the gonyx of the lower jaw; but I think that all these differences may be referable to the age and sex of the specimens, the upper jaw being more deflexed and lengthened as the animal increases in age. All the older specimens have a small, conical, rugose, bony prominence in the middle line of the front of the lower jaw, and the apex of the coronoid process truncated and expanded into an angle behind and before, as represented in De Blainville and Cuvier's figures of *M. australis* and *M. latirostris*. This is even the case in the skull of a very young animal with only the milk teeth.

On the other hand, in Dr. Baikie's skull of *M. Vogelii*, and in M. De Blainville's figure of *M. Senegalensis*, the coronoid process of the lower jaw is narrow above, with the hinder upper part obliquely rounded off, and with a slight angle in front; so that this is probably the character of the African species. I may also remark, that the front of the lower jaw of Dr. Baikie's specimen is produced and very differently shaped from that of any of the American skulls, and in this character it differs from M. De Blainville's figure of *M. Senegalensis*; but this difference may be only in consequence of its youth.

Dr. Harlan observes:—"Cuvier estimates the teeth at 36, nine on each side; in both my specimens they do not exceed 32, eight on each side."

In the very young skull above mentioned, which has holes for the rudimentary upper cutting or canine teeth, there are only 24, viz. six on each side; and the two hinder on each side must have been hidden in the gums. In the older skulls some have eight and others nine on each side, but in most of them only six on each side are perfect; as the anterior one on each side drops out as the new ones are formed behind, and in each of the skulls two hinder on each side are in the process of development.

But the question of the permanent specific difference between the *M. australis* from Cayenne, the *M. latirostris* from East Florida, Jamaica and Cuba, and between *M. Senegalensis* of Blainville (not of Cuvier, which is like the first) and *M. Vogelii*, must wait for

solution until a larger series of skulls of these species can be procured, and until the other parts of the skeleton can be compared; it being always borne in mind, at least according to my experience, that the skulls and other parts of the skeleton of the animals are quite as liable to vary in form and structure as any of the external soft parts by which they are moulded.

2. ON THE GENUS *NECTURUS* OR *MENOBRANCHUS*, WITH AN ACCOUNT OF ITS SKULL AND TEETH. BY DR. JOHN EDWARD GRAY, F.R.S., F.L.S., V.P.Z. & ENT. SOC. ETC.

Dr. Kaup lately sent to me the skull of the *Proteus of the Lakes*, *Necturus maculatus*. As it presents some peculiarities, I am induced to lay a figure and some observations on it before the Society.

1. It is the general belief of the inhabitants of Lake Erie that the bite of the *Proteus of the Lakes* is poisonous.

Dr. Holbrook observes that the fishermen regard these animals "as poisonous, and are consequently seldom taken in hand."

The Hon. Miss Amelia Murray in her 'Letters' mentions this animal as caught in a net at Detroit, under the name of *Fish Lizard* (vol. i. p. 172), and observes: "The fishermen said its bite was very poisonous, and it had the yellowish-brown lurid look which seems to appertain to venomous reptiles; but Dr. Kirtland says it is perfectly harmless."

And this latter opinion appears to be the almost unanimous impression of the naturalists of America.

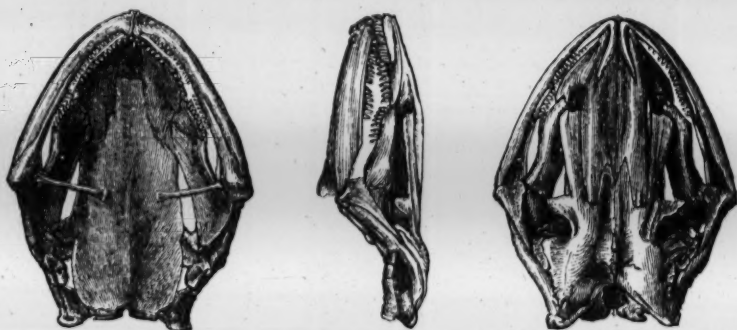
Yet the examination of the teeth will almost justify the popular belief, and at least render it very desirable that the animal should be examined in its living state, and that its bite be submitted to careful experiment.

The upper jaw of the skull is furnished with two series of small, acute, uniform, nearly transparent, conical, slightly curved teeth, the outer series being placed on the narrow intermaxillary bone, the inner series on the front edge of the vomer and on the outer edge of the lateral processes of the pterygoid bone. The lower jaw has a single series of similar teeth, which lock between the two series above described.

All these teeth have a conical cavity on the hinder part of their base, with a short linear slit on the middle of the inner side, and an oblong perforation above the slit in the middle of the inner side of the tooth. The form of these teeth is exactly similar to the fang of poisonous Serpents; that is to say, the cavity is not a hollow in the substance of the tooth itself, but is formed by the sides of the teeth being produced and folded together, leaving a conical cavity in the inner side of the base, as is easily proved by the examination of the teeth, which shows that the cavity is lined with enamel; and the junction of the two lateral expansions is rarely complete, but marked by a more or less distinct or continued slit between the basal notch and the subcentral foramen. In the poisonous Snakes the duct of

the poison occupies this cavity ; and the similarity of the form and structure leads to the idea that it may be used for the same purpose in the *Proteus of the Lakes*.

The chief difference between the teeth of the *Proteus of the Lakes* and the fangs of Serpents, is, that in the former the upper aperture of the cavity is nearer to the centre of the tooth, some distance from the apex, while in the fang of the Serpent it is generally near to the tip.



I know of no other instance of a Batrachian having this structure of its teeth, nor do I know any instance, except in the Mexican Lizard, called *Heloderma horrida*, in which *all the teeth* are uniformly furnished with a basal cavity and foramen ; and this Lizard is said to be noxious, but the fact has not been distinctly proved.

2. When Dr. Barton, in his paper on the *Siren*, first described the Hell-bender (*Protonopsis horrida*), he considered the *Proteus of the Lakes* as the young state of the latter species.

The skull bears more affinity to the skull of that animal than to any other Batrachian, and the difference between them is just such as one might expect between the larva and adult of other similar animals ; and it will be observed that the *Proteus of the Lakes* is only known in its larva-like state, and *Protonopsis*, as far as I know, only in its adult form.

The first great, and indeed almost insurmountable, argument against regarding the *Proteus of the Lakes* and the Hell-bender as two states of the same species, is the geographical distribution of the animals as given by the American herpetologist.

Thus Holbrook, for example, states, "The *Menopoma Alleghaniensis* (Hell-bender) is found in the Alleghany river and its tributaries, and doubtless inhabits many of the branches of the Ohio and Mississippi rivers ;" and *M. fusca*, "the waters of the mountainous regions of North Carolina and Georgia ;" while the *Proteus of the Lakes* (*Menobranchius maculatus*) has as yet been found only in Lake Champlain and Lake Erie and their tributary streams.

It is true that a second species of the genus, *Menopoma lateralis*, according to Dr. Holbrook, "has a wide range, it being found in many of the rivers and streams that open into the Mississippi on its eastern

side; but I am not aware of its existence west of that river. Say found it as far north as Pittsburg in Pennsylvania, and Troost as far south as Cumberland river in Tennessee:" and further, "the *Menobranchnus lateralis* was first described by Say from a specimen taken by a hook in the Alleghany river." He proceeds: "At first I was disposed to believe that the *M. maculatus* and *M. lateralis* were one and the same animal, but I am now convinced that the latter is at least a well-marked variety, if not a distinct species; it is more slender in proportion, its colours and markings different; it is found only in the western waters that run into the Mississippi, while the former inhabits the rivers and streams that flow into the northern lakes, and all the tributaries of the St. Lawrence river."

From these remarks on the observations of other American herpetologists, one may conclude, that though one species or variety of *Menobranchnus* is found in the same system of waters as the *Menopoma*, the *Menopoma* has not hitherto been observed in the same lakes, or indeed in the same district of country, where one variety or species, viz. the *Menobranchnus maculatus*, is alone found, and where it is abundant.

But an experienced American naturalist, Dr. Baird, has observed, that "the non-discovery of the adult is no argument against its existence. I had caught hundreds of the very remarkable larva of *Pseudotriton Salmoeneus* near Carlisle, before I found an adult." (Journ. Acad. N. Sci. Philad. 1849, 292.)

Dr. Holbrook observes, that "the *Menobranchnus maculatus* is seldom taken except in the months of April and May, which is their spawning season. Their eggs are about the size of peas, and as many as one hundred and fifty have been counted in a single female."

This would lead one to believe that they are adult animals; but eggs have been equally found in the *Axolotl* of Mexico, which is regarded by most naturalists as a larva.

3. It is to be observed, that though the *Proteus of the Lakes* (*Necturus*) has a more distinct and separate opercular flap, united by a distinct fold under the throat, than either the *Proteus* of Carniola or the *Siren*, and in this respect more nearly resembles the *Axolotl* of Mexico and the larva of *Tritons*—yet, that, like the *Proteus anguinus* and the *Siren*, it has only two slits on each side of the neck, with a single free ray between them, the anterior and posterior cartilaginous ray being united to the skin, as in those genera; while the *Axolotl* and the larva of *Tritons* have the gill flat, quite free from the gill-rays, and there are three slits between the gill-rays as well as the larger anterior one, making four slits on each side, and the inner edge of the rays being toothed as in fishes.

From these considerations I am inclined for the present to consider the *Proteus of the Lakes* as a distinct kind of Batrachian, which is arrested in its development and never reaches the perfect state.

The skull is much more developed than in the other genera of *Meantia*, and in its outline and disposition of its teeth it resembles that of the genus *Protonopsis* as figured by Cuvier (Oss. Foss. ii.

409. t. 26. f. 3, 4, 5), but there are no maxillary bones, and the nasal and frontals are more developed.

The exterior nostrils are on the upper surface of the margin of the nose, above the first third of the upper lip; and the inner nostrils are large, and, as in the other *Meantia*, not on the palate, but on the side of the mouth between the lips and the outer edge, near the hinder part of the series of vomerine teeth, nearly as they are in the genus *Axolotl*, well figured by M. Bibron (Herpet. t. 95. f. 2 a).

4. I may observe, that we have specimens both of *Necturus maculatus* and *N. lateralis* in the British Museum, the latter from the Ohio; and I cannot discover any difference between them, except that the one named *N. lateralis* has two broad, pale, dorsal streaks, and is about half the size of the other specimens; and I doubt if these dorsal streaks are not the result of youth, and vanish as the animal increases in size, as is the case with the *Siren*.

5. While on these animals, I may observe, that Dr. Garden's specimen of *Siren* that was originally described by Ellis, which is now in the British Museum, shows a number of lines of mucous pores on the chin and on the head, the latter not being so distinct as the former, and a very distinct series of oblong white spots, forming an interrupted line along the upper part of the sides of the body, and continued to the middle of the sides of the tail; the spots on the hinder part of the body and tail being larger, more distinct, and closer. These spots evidently represent the lateral lines in *Tritons* and fish, and I have seen them mentioned in the modern descriptions of the animal.

3. DESCRIPTIONS OF THREE NEW AND VERY BEAUTIFUL SPECIES OF BIRDS, FROM GUATEMALA AND FROM THE ISLAND OF LOMBOCK. BY JOHN GOULD, Esq., F.R.S., V.P.Z.S. ETC.

(Aves, Pl. CXXIII.)

COTINGA AMABILIS. (Pl. CXXIII.)

Male. Head, lores, line beneath the eye, all the upper surface, lesser wing-coverts, upper tail-coverts, sides of the chest, band across the breast. Flanks, vent and under tail-coverts fine verditer blue; wings dull black, the greater coverts, spurious wing and the secondaries margined with verditer blue; tail dull black, margined externally with dull verditer blue; chin, throat and centre of the abdomen very rich purple.

Female. Upper surface greenish-brown, each feather tipped with greyish-white; under surface greyish-white, with dark brown centres to the feathers of the breast, upper part of the abdomen, and flanks; vent and under tail-coverts dull white.

Total length, 8 inches; bill, $\frac{3}{4}$; wing, $4\frac{1}{2}$; tail, $2\frac{3}{4}$; tarsus, $\frac{7}{8}$.

Hab. Guatemala.

Remark.—The *Cotinga amabilis* forms one of the most beautiful

members of this lovely genus of birds, and affords the first instance of a species being discovered to the northward of the Isthmus of Panama. It is allied to *Cotinga cincta* and *C. Maynana*; the chest being crossed by a band as in the former, which it also resembles in the black colouring of the under surface of the wing, while it assimilates to the latter in the peculiar tint of the verditer blue of the upper surface and flanks.

For a knowledge of this lovely species we are indebted to the researches of George Ure Skinner, Esq., than whom no one has done more towards making us acquainted with the rich ornithological and botanical treasures of the fine country to which this bird belongs.

HALCYON FULGIDUS.

Head, cheeks, back of the neck, back, wings, flanks and under tail-coverts deep black, washed with rich ultramarine blue on the back of the neck, back and wings; rump-feathers glaucous or chalky white, with black bases, and with a narrow line of blue between the black and the white portion, which alone is seen; tail deep ultramarine blue; chin, breast, and abdomen white; bill and feet coral-red.

Total length, $12\frac{1}{2}$ inches; bill, $2\frac{1}{4}$; wing, $5\frac{1}{4}$; tail, 5; tarsus, $\frac{3}{4}$.

Hab. The Island of Lombock.

Remark.—This is an exceedingly fine species, of which I have not been able to find a description. I am therefore induced to believe that it is new: still it may be contained in the Leyden Collection; but on this point I have consulted Mr. Frank, who is well acquainted with its rich stores, and he tells me that he has no recollection of it.

PITTA CONCINNA.

Head, back of the neck, cheeks, chin and stripe down the centre of the throat velvety black; from the nostrils over each eye a broad mark of deep buff, posterior to which is a narrower one of pale glaucous blue; back, tail and wings dark grass-green; lesser wing-coverts and a band across the rump glossy verditer blue; primaries and secondaries black, the fourth, fifth and sixth of the former crossed by a band of white near their base, and all the primaries tipped on the external web with olive-grey; upper tail-coverts black; under surface delicate fawn-colour, becoming much paler where it meets the black of the cheeks and throat; centre of the abdomen black; vent and under tail-coverts fine scarlet; bill black; feet fleshy.

Total length, 6 inches; bill, 1; wing, 4; tail, $1\frac{1}{2}$; tarsus, $1\frac{3}{4}$.

Hab. The Island of Lombock.

Remark.—This bird ranks as one of the smaller species of this particular section of the group, it being even less than the *Pitta brachyura* of authors, to which it bears a general resemblance, but from which the black colouring of its throat will at all times distinguish it.

For this and the preceding species we are indebted to the researches of A. R. Wallace, Esq.

No. CCCXXXI.—PROCEEDINGS OF THE ZOOLOGICAL SOCIETY.

4. DESCRIPTION OF A NEW TANAGER OF THE GENUS EUPHONIA.
BY PHILIP LUTLEY SCLATER, M.A., F.L.S. ETC.

(Aves, Pl. CXXIV.)

Mr. Gould having placed in my hands for examination some specimens of *Euphonia*, which he has lately received from Guatemala, I am enabled to exhibit to the Society examples of both sexes of what I believe to be a hitherto uncharacterized species of that genus. I am no friend to the too frequent practice of calling animals after individuals, but I feel that I shall meet with approbation in this instance if I confer on the present bird the name of one of the most eminent naturalists of the day, to whom moreover I am indebted for numerous acts of kindness from the period when I first had the pleasure of his acquaintance. I therefore propose to call this species

EUPHONIA GOULDI.

♂. *Supra olivacea, æneo induta : pileo usque ad oculos cum fronte flavis : subtus, gula et cervice flavescenti-olivaceis, abdomine medialiter castaneo, hoc colore flavo utrinque marginato ; lateribus olivaceis flavo mixtis : crisso castaneo : rostro et pedibus nigris.*

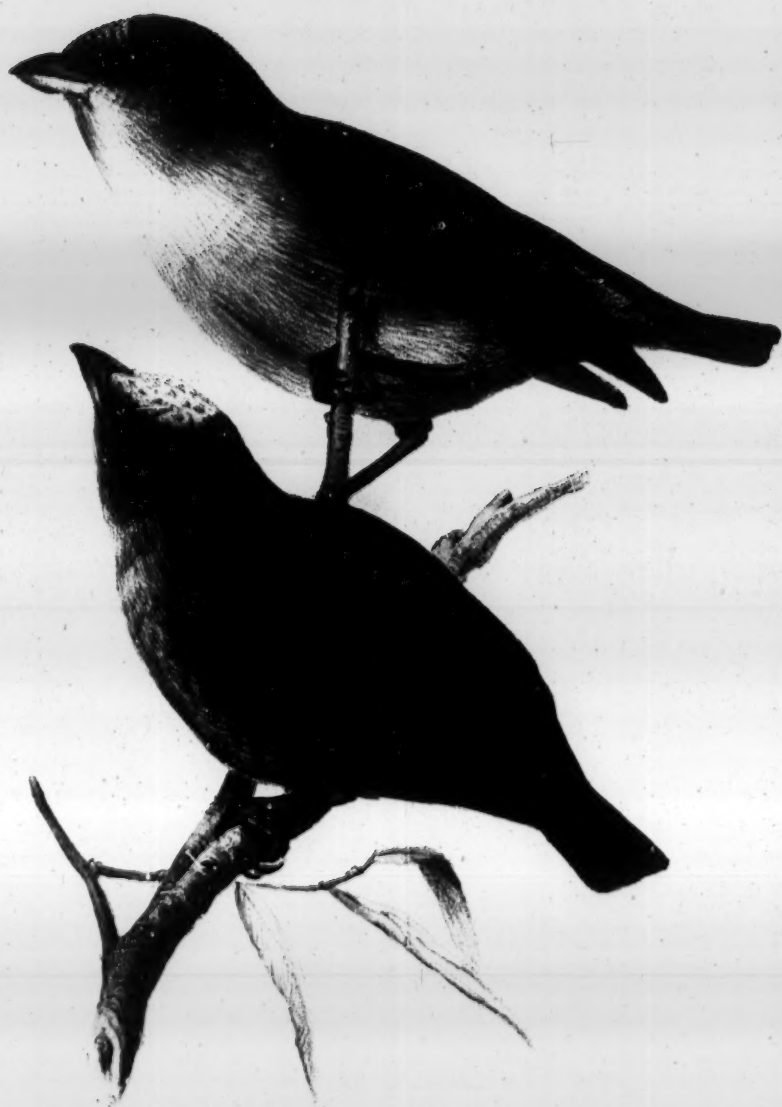
♀. *Supra mari similis sed dilutior, fronte et pileo antico rubris : subtus flavescens, abdomine medio cum crisso dilute castaneis, lateribus flavido-olivaceis.*

Long. tota 4.1, alæ 2.2, caudæ 1.0, tarsi 0.7.

Hab. In Guatemala et Mexico Meridionali.

Gould's *Euphonia* does not sufficiently resemble any other of the known members of the group to render it liable to be confounded with them. It may, I think, be most naturally placed at the head of the section containing *Euphonia pectoralis*, *E. rufiventris* and others (which has been denominated *Iliolopha* by Prince Bonaparte), and will serve to connect them with the yellow-headed species which precede them in my arrangement. I have suspected its existence for some time, but these examples are the first good ones I have seen of it. I have had for several years in my possession a bird which I now find to be an immature individual of this species; and M. Sallé's collection comprised a single specimen not in very good condition, which he obtained in Southern Mexico. I gave a short description of the latter bird without naming it in my list of his collection (see P. Z. S. 1856, p. 303), but was mistaken (as I now see) in considering it a female.

This *Euphonia* is the fourth additional Tanager I have met with since completing the synopsis of these birds given in the Proceedings for last year; the others being *Calliste rufigena* (P. Z. S. 1856, p. 311), *Saltator melanopterus* (Pr. Ac. Sc. Phil. viii. p. 361), and *Pyranga roseigularis* (P. Z. S. 1857, p. 6). The latter bird was long ago described by Dr. Cabot, but at the time of completing my synopsis I had not seen specimens of it.



5 00 58

5. REVIEW OF THE SPECIES OF THE SOUTH AMERICAN SUB-FAMILY TITYRINÆ. BY PHILIP LUTLEY SCLATER, M.A., F.Z.S., F.L.S. ETC.

The birds of the old genus *Tityra* of Vieillot constitute a very natural and well-defined group peculiar to tropical America, which has been quite rightly, as I think, raised to the rank of a subfamily by Mr. Gray and succeeding writers. They seem to me to form a link between the two great South American families *Tyrannidæ* and *Cotingidæ*—the true *Tityræ* pointing rather towards the latter of these groups, and the genus *Pachyrhynchus* to the former. In anatomical characters, however, according to Müller, they rather agree with the Fruit-eaters, and for the present therefore, until this part of the subject has been further worked out, I am inclined to think they should be arranged within the confines of the family *Cotingidæ*.

The great diversity of plumage which occurs in the different sexes and ages of these birds (another character which betrays their *Cotingine* affinities) has occasioned the creation of many nominal species; and Mr. George Gray, in his 'Genera of Birds,' where merely a list of described species is given without any attempt at reduction of the synonyms, notices no less than forty-six supposed members of the subfamily. Dr. Cabanis, in his 'Ornithologische Notizen' (Wiegmann's Arch. f. Nat. 1847), was the first who undertook a critical examination of the subject, the result of which was to reduce the number of species from forty-six to sixteen. With his views I am disposed for the most part to agree. I should merely observe, that in one or two instances he has united species that have some claim to be considered distinct, and that it is to be lamented that in so difficult a group he did not give scientific distinctive characters for the males and females of every species.

In the 'Proceedings' of this Society for 1851 (p. 45 *et seq.*) are some remarks by Dr. Kaup on the birds of this subfamily, which are worthy of much attention. But of the species considered there as undescribed, one at least has been already previously named, and the others are such as, after examination of the type-specimens, I should hardly be inclined to regard as really new. Prince Bonaparte's arrangement of this group in his 'Conspectus' is adopted from Cabanis' article. In what follows I have attempted to make a careful review of the members of the subfamily *Tityrinæ*, giving short descriptions of the sexes of each species, when I have been successful in meeting with them, and the most necessary synonyms, particularly where my views on this latter point differ from those of Dr. Cabanis. Although no species is inserted of which I have not personally examined specimens, I have the satisfaction of recording the existence of twenty-two species instead of sixteen—the number assigned in the last general account published; and I have been very particular about localities, a point much too generally overlooked by writers on ornithology; so that, although my subject is not quite a new one, I shall hope to have contributed some fresh information upon it.

Dr. Cabanis has recognized three different genera in the present group of birds. About the first of these—the true *Tityra*—there can, I think, be no question. The strong somewhat compressed beak, the want of bristles at the base of the bill, the peculiar scimitar-like shape of the second abnormal primary in the adult male, and the absence of any strong dissimilarity in the coloration of the two sexes, render the six birds composing it readily distinguishable from the rest of the group, and eminently entitle them to generic distinction. A group of rather less value appears to be that of the black-plumaged species, which naturally follow next in order. Here the rictal bristles are present, although not so well developed as farther on in the subfamily; the second abnormal quill of the males is broad and acuminate as in the true *Pachyrhamphus*; the females are clothed in a nearly uniform brown. These birds form the commencement of Dr. Cabanis' genus *Pachyrhamphus*. But I confess I cannot agree with Dr. Cabanis in separating generically the type of his genus *Bathmidurus* from *Pachyrhamphus Cuvieri* and *atricapillus*, and I therefore think it best for the present to employ one term as a generic name for the whole of the residue of the species—after removal of the true *Tityra*—leaving the name *Bathmidurus* and other terms lately coined to mark out the divisions of subgeneric value.

Fam. COTINGIDÆ.

Subfam. TITYRINÆ.

Rostrum brevius quam caput, basi dilatata, lateribus ad apicem plerumque compressis, culmine leniter incurvo, apice uncinata, gonyde ascendente: nares rotundæ, fere nudæ, rictus nudus aut setis paucis præditus: alæ elongatæ e primariis decem, secundariis novem; remigibus tertia et quarta primam superantibus et longissimis, remige secunda in maribus adultis abnormaliter brevi, falciformi aut apice acuminata: cauda e rectricibus duodecim, modica, lata: tarsi modici, acrotarsiis regulariter scutatis; paratarsiis squamulis numerosis obovatis obtectis: digiti fortes, horum exteriorum cum medio ad basin conjuncto et interiorem longitudine paulo excedente, posteriore elongato, unguibus acutis.*

* Mr. G. R. Gray, in his 'Genera of Birds,' says that "the wings are sometimes furnished with a spurious quill beneath the first quill." That this so-called spurious quill is the true second primary abnormally shortened is easily demonstrated by a comparison of the wings of the adult male and female; by which it will be seen that the second primary of the latter, which is of the usual length, corresponds in position to the reduced feather in the male bird. And, unless this reduced feather be taken into calculation, the males will be found only to have nine primaries, whereas the females have ten.

Genus I. TITYRA.

Tityra, Vieill. Analyse, p. 39, 1816.*Psaris*, Cuv. Règn. An. i. p. 340 (1817).*Erator*, Kaup, P. Z. S. 1851, p. 47.

Rostrum forte, dilatatum, ad apicem compressum, uncinatum, rictu non setoso : alæ elongatæ, marium remige alari secunda brevi, falciformi : cauda breviuscula, quadrata : ptilosis marium albonigra, fæminarum obscurior haud valde dissimilis.

a. *Tityra* (loris nudis).

1. TITYRA CAYANA.

Lanius cayanus, Linn. S. N. i. p. 137.*Tityra cinerea*, Vieill. Enc. Méth. p. 859.*Psaris virgata*, H. Smith (♀).*Psaris cayanensis*, Sw. Class. B. ii. 255.*Psaris guianensis*, Sw. An. in Men. p. 286.*Psaris nævius*, Less. Tr. d'Orn. p. 379.*Tityra cayana*, Vieill. Gal. Ois. pl. 134; Cab. Orn. Not. p. 238; Schomb. Guian. iii. 697; Bp. Consp. p. 179.*Piegriche grise de Cayenne*, Buff. Pl. Enl. 304 (♂).*Piegriche tacheté de Cayenne*, Buff. Pl. Enl. 377 (♀).

♂. *Cinerascens albus subtus pallidior : mento summo, pileo alis et cauda nigris : secundariis ultimis dorso concoloribus : loris nudis et cum rostro rubris : hujus apice nigra : pedibus nigris.*

♀. *Cinerascens, subtus dilutior : dorso et corpore subtus nigro longitudinaliter striatis : pileo, alis caudaque nigris, secundariis ultimis dorso concoloribus.*

Long. tota 7.5, alæ 4.6, caudæ 2.6.

Hab. Cayenne (Buff.); Brit. Guiana (Schomb.); Trinidad (Robin); Venezuela, Cumana (Beauperthuy); New Grenada, Bogota.

Mus. Brit., Paris., P. L. S.

The woodcut represents (fig. a) the first and (fig. b) the second primary of the adult male of this species.

2. TITYRA BRASILIENSIS.

Pachyrhynchus cayanus, Spix, Av. Bras. ii. pl. 44. f. 1. p. 32.

Psaris cayana, D'Orb. Voy. p. 301.

Psaris brasiliensis, Sw. An. in Men. p. 286.

Tityra brasiliensis, Cab. Orn. Not. p. 239; Bp. Consp. p. 179.

♂. *Cinerascenti-albus subtus pallidior: pileo, mento, alis et cauda nigris: secundariis ultimis dorso concoloribus: loris minus denudatis cum ipsa basi rostri rubris, hujus reliqua parte nigra: pedibus nigris.*

♀. *Cinerascens, subtus dilutior, nigro longitudinaliter striata: alis caudaque nigris, secundariis ultimis dorso concoloribus.*

Long. tota 8·5, alæ 5·1, caudæ 3·2.

Hab. Brazil, prov. Piauhy (Spix); Rio de Janeiro; Corrientes (D'Orb.); Bolivia (D'Orb.); Paraguay (Azara).

Mus. Brit., Paris., P. L. S.

This bird may be distinguished from the *T. cayana* by its larger size and nearly entirely black bill.

3. TITYRA SEMIFASCIATA.

Pachyrhynchus semifasciatus, Spix, Av. Bras. ii. pl. 44. fig. 2. p. 32.

Psaris semifasciat., D'Orb. Voy. p. 301; Tsch. Faun. Per. p. 146.

Tityra semifasciata, Cab. Orn. Not. p. 239; Bp. Consp. p. 180.

♂. *Subcinerascenti-albus, subtus purior: facie antica cum mento alisque nigris: secundariis ultimis dorso concoloribus: cauda alba, rectricibus omnibus, nisi unæ utrinque extimæ pogonio interno, nigro late transfasciatis: loris nudis et cum rostro rubris, hujus ipsa apice nigra: pedibus nigris.*

♀. *Mari similis sed supra magis cinerascens et brunneo tincta: pileo nigricanti-brunneo.*

Long. tota 8·75, alæ 5·0, caudæ 3·0.

Hab. Eastern Peru, Wood-region (Tsch.); Bolivia, S. Cruz de la Sierra (D'Orb.).

Mus. Paris., P. L. S.

4. TITYRA PERSONATA.

Tityra personata, Jard. & Selb. Ill. Orn. i. pl. xxiv.

Psaris mexicanus, Less. R. Z. 1839, p. 41.

Psaris tityroides, Less. R. Z. 1842, p. 210.

Tityra mexicana, Selater, P. Z. S. 1856, pp. 141 & 297.

♂. *Simillimus speciei præcedenti, sed caudæ rectricibus omnibus in pogonio utroque nigro transfasciatis.*

♀. *Supra brunnescenti-cinerea, uropygium versus dilutior: subtus alba, mento concolore.*

Hab. S. Mexico, Vera Cruz (Sallé); Xalapa (Mus. Berol.); Guatemala (Mus. Brit.); Nicaragua (Delattre); Chiriqui (Bridges); S. Martha, New Grenada (Verreaux).

Mus. Brit., P. L. S.

Whether this bird is really distinct from the preceding is perhaps not quite certain. I have had hardly a sufficient number of examples for comparison. But, as far as I have observed, the difference in the coloration of the tail-feathers appears constant.

b. *Erator* (loris plumosis).

5. *TITYRA INQUISITRIX*.

Lanius inquisitor, Licht. Doubl. p. 50.

Psaris erythrogenys, Selby, Zool. Journ. ii. p. 483; Sw. Nat. Lib.
x. pl. 3 (♀).

Psaris selbii et natterii, Sw. An. in Men. p. 286.

Psaris inquisitor, D'Orb. Voy. p. 302.

Psaris jardinii, Sw. Zool. Ill. n. s. pl. 35 (♂).

Tityra inquisitrix, Cab. Orn. Not. p. 239; Bp. Consp. p. 180.

♂. *Albus, supra cinereo tinctus: pileo, alis et cauda nigris; secundariis ultimis dorso concoloribus: rostro et pedibus nigris.*

♀. *Alba, supra cinerascens: fronte et lateribus capitis rufis: pileo, alis et cauda nigris: rectricum basi et ipsa apice albidis: secundariis ultimis dorso concoloribus.*

Long. tota 6·75, alæ 3·9, caudæ 2·5.

Hab. Brazil, S. Paolo (*Licht.*); Bolivia (*D'Orb.*); Cayenne; New Grenada; Bogota.

Mus. Brit., Paris., P. L. S.

6. *TITYRA ALBITORQUES*.

Tityra albitorques, DuBus, Bull. Ac. Brux. 1847, xiv. pt. 2.
p. 104; Rev. Zool. 1848, p. 244; Sclater, P. Z. S. 1855, p. 150.

Psaris fraseri, Kaup, P. Z. S. 1851, p. 47. pl. xxxvii. (♂),
xxxviii. (♀).

♂. *Albus, supra cinereo tinctus: pileo et alis nigris, secundariis ultimis dorso concoloribus: cauda alba, fascia subapicali lata nigra: rostro pedibusque nigris.*

♀. *Supra magis cinerascens et dorso brunnescente tincto: fronte albida: pileo reliquo nigro: lateribus capitis rufis.*

Long. tota 6·75, alæ 3·6, caudæ 2·4.

Hab. Eastern Peru (*DuBus*); New Grenada; Bogota.

Mus. Brit.

This species is easily distinguishable from *T. inquisitrix*, which it generally closely resembles, by its white tail banded with black.

Genus 2. *PACHYRHAMPHUS*.

Pachyrhynchus, Spix, Av. Bras. ii. p. 31 (1824).

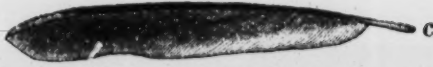
Pachyrhamphus, G. R. Gray, List of Gen. (1838).

Bathmidurus, Cab. Orn. Not. in Wieg. Arch. 1847, p. 243.

Chloropsaris, Kaup, P. Z. S. 1851, p. 45.

Platyptaris, Bp. Ann. d. Sc. Nat. 1854.

Callopsaris, Bp. Ann. d. Sc. Nat. 1854.



*Rostrum magis conicum, minus dilatatum et ad apicem minus compressum; apice minus uncinata; rictu plus minusve setis ob-
sito: alæ elongatæ, marium remige secunda brevi, lata, deinde
emarginata et apice acuminata: cauda elongatior quam in
genere præcedente: ptilosis sexuum valde diversa, marium
albo-nigra, fœminarum brunnea.*

a. *Platyptaris*.

1. *PACHYRHAMPHUS NIGER*.

Lanius niger, Gm. S. N. i. p. 301.

Pachyrhynchus aterrimus, Lafr. R. Z. 1846, p. 320.

Tityra leuconotus, Gray's Gen. pl. 63 (♂ et ♀); Gosse, B. Jam.
p. 187.

Pachyrhampus nigrescens, Cab. Orn. Not. p. 241; Bp. Consp.
p. 180.

♂. *Niger subtus paulo dilutior: scapularium macula basali
alba: rostro et pedibus nigris.*

♀. *Brunnescenti-cinerea, pileo, alis et cauda brunneis: subtus
albescenti-cinerea: gutture et pectore rufo tinctis.*

Long. tota 7·0, alæ 4·0, caudæ 3·0.

Hab. Jamaica (Gosse).

Mus. Brit., Berol., P. L. S.

Mr. Gosse has written a very interesting account of this species
in his 'Birds of Jamaica,' giving details as to its habits, food, nidi-
fication, &c., which is really almost the only reliable information we
possess concerning these points in respect of any bird of the group.

2. *PACHYRHAMPHUS VALIDUS*.

Tityra atricapilla (♂) et *rufa* (♀), Vieill. Nouv. Dict. iii.
p. 347-8, et Enc. Méth. 859.

Lanius validus, Licht. Doubl. p. 50.

Pachyrhynchus cinerascens, Spix, Av. Bras. ii. pl. 46. f. i. p. 34 (?).

Psaris cristatus, Sw. Zool. Ill. ser. 2. pl. 41 (♂).

Tityra pileata, Jard., Selb. Ill. Orn. i. pl. 17 (♀).

Psaris strigatus et *megacephalus*, Sw. ?

Pachyrhampus validus, Cab. Orn. Not. p. 240; Bp. Consp.
p. 180.

♂. *Niger, semicristatus, uropygium versus paulo dilutior: scapu-*

larium macula basali alba : subtus fusco-cinnamomeus, gula albicantiore : rostro corneo : pedibus nigris.

♀. *Supra læte rufa, pileo nigro : subtus fusco-cinnamomea, rufo tincta : cauda unicolore rufa.*

Long. tota 7·5, alæ 3·8, caudæ 2·8.

Hab. South-eastern Brazil, S. Paolo (*Licht.*).

Mus. Brit., P. L. S.

3. PACHYRHAMPHUS PECTORALIS.

Querula minor, Less. Tr. d'Orn. p. 363.

Psaris roseicollis, Jard. & Selb. Ill. Orn. iv. pl. 28.

Pachyrhynchus pectoralis, Sw. An. in Men. p. 288.

Pachyrhampus minor (partim), Cab. Orn. Not. p. 241 ; Bp. Consp. p. 180.

Psaris pectoralis, Kaup, P. Z. S. 1851, p. 46.

♂. *Supra niger, semicristatus : scapularium macula basali alba : subtus paulo dilutior, fascia subgutturali angusta rosea : macula primariorum basali interna alba : rostro et pedibus nigris.*

♀. *Rufa, pileo nigro, subtus dilutior (?)*.

Long. tota 6·0, alæ 3·5, caudæ 2·5.

Hab. Cayenne ; New Grenada ; Bogota.

Mus. Paris., P. L. S.

The white exterior margin of the second abnormal primary, which Dr. Kaup relies upon as the specific character of this species, is not sufficient to distinguish this bird from *P. aglaia*, in some specimens of which I find the same peculiarity. But it may be easily recognized from the latter bird by its nearly uniform sooty-black colouring above and below, and the narrow rosy bar on the throat. I have a Bogota skin apparently referable to this species.

4. PACHYRHAMPHUS ROSEICOLLIS.

Psaris roseicollis, Lafr. et D'Orb. Syn. Av. in Mag. de Zool. 1837, p. 42 ; D'Orb. Voy. p. 302.

♂. *Cinerascenti-niger, pileo intensiore et nigro : scapularium basibus albis : subtus cinerascenti-niger, vitta subgutturali rosea : primariis ad basin interne albo maculatis : rostro et pedibus nigris.*

Long. tota 8·0, alæ 3·8, caudæ 2·75.

Hab. Bolivia (*D'Orb.*).

Mus. Paris.

Though I have seen a type of this species in the Magazin du Jardin des Plantes at Paris, I have never had an opportunity of comparing it with examples of its two near allies. My impression is, however, that it is distinct from *P. pectoralis* (than which it seems larger and of a more cinereous tinge below) and also from *P. aglaia*. M. de Lafresnaye has remarked upon the differences between it and the latter species in the Rev. Zool. 1839, p. 98.

5. *PACHYRHAMPHUS AGLAIÆ.*

Pachyrhynchus aglaia, Lafr. R. Z. 1839, p. 98.

Psaris aglaia, Kaup, P. Z. S. 1851, p. 46.

Pachyrhampbus aglaia, Selater, P. Z. S. 1856, p. 297.

♂. *Niger, subcristatus, uropygium versus schistacescentior: subtus pallide cinereus, collo antico toto roseo, mento albescente: scapularium utrinque basi et remigum macula basali interna albis: remige secunda brevi nigricante, margine externa angustissima et macula parva ad ipsam basin albis: rostro et pedibus nigris.*

♀. *Rufescens: alis intus nigris; harum marginibus et cauda tota late rufis: pileo subcristato, nigro: subtus albescenti-cinnamomea, tectricibus subalaribus cinnamomeis.*

Long. tota 6·5, alæ 3·5, caudæ 2·6.

Hab. Mexico, Coahuila (*Lieut. Couch*); Vera Cruz; Cordova (*Sallé*); Xalapa (*Mus. Ber.*).

Mus. Derbiano et P. L. S.

This Mexican species is easily distinguished from *P. pectoralis* by its lighter ash-coloured plumage and distinct black head, as well as by the throat being wholly of a rosy red. M. Sallé's Mexican collection (of which an account is given, P. Z. S. 1856, p. 290 *et seq.*) contained five examples of different sexes and ages.

6. *PACHYRHAMPHUS LATIROSTRIS.*

Pachyrhampbus latirostris, Bp. Compt. Rend. 1854, et Notes Orn. p. 87.

Platypsaris latirostris, Bp.

♂. *Cinerascens, pileo nigro: subtus dilutior gula et ventre medio albicantibus: alis caudaque nigrescenti-cinereis: interscapulii pennis basi niveis: rostro et pedibus nigris: illius ipsa apice albida.*

♀. *Rufa, subtus albo-rufa, pileo nigro: remigibus intus et apice nigris: cauda rufa* (Bp.).

Long. tota 5·6, alæ 3·2, caudæ 2·3.

Hab. Nicaragua (*Delattre*).

Mus. Brit.

I have seen but one example of this species, which was received by the British Museum from Parzudaki of Paris. It is marked "Nicaragua," and there is no doubt, from the peculiar make of the skin, that it is one of Delattre's specimens. This bird I consider to be a strict congener of the last species *P. validus*. It is, as appears from Mr. Gray's 'List of Genera,' the type of Prince Bonaparte's genus *Platypsaris*, and I have therefore placed that term at the head of this section of the present group.

7. *PACHYRHAMPHUS SURINAMUS.*

Muscicapa surinama, Linn. S. N. i. p. 325?

Tityra surinama, Strickl. Contr. Orn. 1848, pl. 11. p. 62 (♂).

Bathmidurus surinamus, Bp. Consp. p. 181.

Pachyrhamphus dimidiatus, De Filippi, Cat. Mus. Mediol. p. 31 (1847).

♂. *Supra nitenti-niger, capite subcristato: scapularibus interne niveis: subtus candidus: cauda nigra, rectricibus extimis macula parva apicali alba: rostro nigro-plumbeo: pedibus nigris.*

♀. *Castanea, loris et corpore subtus albidis; pectore rufescente induto: remigibus intus nigricantibus: cauda unicolore castanea.*

Long. tota 5·3, alæ 3·1, caudæ 2·3.

Hab. Surinam (Linn.); Cayenne.

Mus. P. L. S. (♂ et ♀ ex Cayenne).

b. *Pachyrhamphus*.

8. *PACHYRHAMPHUS VIRIDIS*.

Tityra viridis, Vieill. Nouv. Dict. iii. p. 348 (1817), et Enc. Méth. p. 860.

Psaris cuvieri, Sw. Zool. Ill. i. pl. 32 (1820).

Platyrhynchus duponti, Vieill. Enc. Méth. p. 843 (1823).

Muscicapa nigriceps, Licht. Doubl. p. 56 (1823).

Muscipeta nigriceps, Max. Beitr. iii. 914.

Pachyrhynchus cuvieri, Spix, Av. Bras. ii. pl. 45. f. 2.

Tityra vieilloti, Jard. & Selb. Ill. Orn. pl. 10. f. 1 (♀).

Pachyrhamphus cuvieri, Cab. Orn. Not. p. 242; Bp. Cons. p. 180.

♂. *Flavescenti-olivaceus; cervice cinerea; pileo nigro; fronte et loris albidis; gula albicanti-cinerea: pectore flavo: ventre crissoque albis, ochraceo tinctis: rostro nigro-plumbeo, tomis pallescentibus: pedibus nigris.*

♀. *Olivacea, pileo concolore, cervice postica et laterali cum gula cinereis, hac pallidiore: alarum tectricibus rufis: pectore flavido: ventre crissoque albidis: rostro pallido: pedibus nigris.*

Long. tota 5·8, alæ 2·8, caudæ 2·0.

Hab. Brazil, Bahia (Licht.).

Mus. Brit., Paris., P. L. S., &c.

The woodcut given with the generic character of the genus *Pachyrhamphus* represents (fig. c) the first and (fig. d) the second primary of the adult male of this species.

9. *PACHYRHAMPHUS CINEREUS*.

Manakin cendré de Cayenne, Buff. Pl. Enl. 687. f. 1 (♂).

Pipra cinerea, Bodd. Table d. Pl. Enl.

Pipra atricapilla, Gm. S. N. i. p. 1003.

Gobemouche roux, &c., Buff. Pl. Enl. 831. f. 1 (♀).

Muscicapa eques, Bodd. Table d. Pl. Enl.

Muscicapa aurantia, Gm. S. N. p. 932.

Lanius mitratus, Licht. Doubl. p. 50.

Pachyrhynchus leucogaster et albifrons, Sw. An. in Men. p. 289?

Pachyrhamphus atricapillus, Cab. Orn. Not. p. 242; Schomb. Guian. iii. 698; Bp. Cons. p. 181.

♂. *Supra cinereus : alis nigris, primariis strictissime secundariis et tectricibus anguste albo marginatis : pileo nigro : frontali linea inter oculos et corpore subtus albis, lateribus in cinereum trahentibus : cauda nigricanti-cinerea, rectricibus intus anguste albo limbatis : rostro et pedibus nigris.*

♀. *Rufescens : cauda et alis extus rufis : subtus rufescenti-alba.*
Long. tota 4·7, alæ 2·7, caudæ 1·8.

Hab. Cayenne (*Buff.*, &c.); Surinam (*Cab.*); Venezuela; Trinidad; S. Martha (*Verr.*); Bogota.

I have not quoted *Psaris parinus*, Kaup, P. Z. S. 1851, p. 48, as a synonym of this species, since I have not had an opportunity of comparing the type with my specimens; but I have very little doubt that the two birds are identical.

c. *Callopsaris*.

10. *PACHYRHAMPHUS VERSICOLOR*.

Vireo versicolor, Hartl. R. Z. 1843, p. 289.

Pachyrhynchus squamatus, Lafr. 1843, p. 291.

Pachyrhampus versicolor, Cab. Orn. Not. p. 243; Bp. Consp. p. 181.

♂. *Supra nitenti-niger, uropygio olivascente : alis nigris, tectricibus et secundariis albo limbatis : subtus olivaceo-viridis ; pectore flavido tincto, lineis angustis nigricantibus omnino transfasciato : rostro nigricanti-plumbeo : pedibus fuscis.*

♀. *Olivacea, pileo nigricanti-cinereo : alarum tectricibus et secundariarum marginibus rufis : subtus dilutior, ventre medio flavicante, lineolis paucis vix apparentibus nigris.*

Long. tota 4·6, alæ 2·6, caudæ 1·9.

Hab. New Grenada, Bogota.

Mus. Brit., Berol., P. L. S.

d. *Bathmidurus*.

11. *PACHYRHAMPHUS NIGRIVENTRIS*.

Pachyrhynchus niger, Spix, Av. Bras. ii. pl. 45. f. 1. p. 33 (1824); Sw. An. in Men. p. 290.

Psaris niger, Sw. Zool. Journ. ii. p. 356 (1825).

Bathmidurus niger, Cab. Orn. Not. p. 243; Bp. Consp. p. 181; Schomb. Guian. iii. 698.

♂. *Fuliginoso-niger, pilei pennis æneo nitentibus, uropygio et corpore subtus paulo dilutioribus et cinereo tinctis : scapularium, tectricum alarium et secundariarum marginibus externis cum rectricum apicibus albis : rostro et pedibus nigris.*

♂. *Rufa, pileo intensiore, subtus valde dilutior, ochraceo.* (?)
Long. tota 5·5, alæ 2·9, caudæ 2·2.

Hab. Cayenne; North Brazil; Venezuela; Trinidad; New Grenada.

Mus. Brit., P. L. S.

12. *PACHYRHAMPHUS POLYCHROPTERUS*.

Platyrhynchus polychropterus, Vieill. Nouv. Dict. xxvii. p. 10 ;
Enc. Méth. p. 835 ; Puch. Arch. d. Mus. vii. 357.

Pachyrhynchus variegatus, Spix. Av. Bras. ii. pl. 43. f. 2 ?

Muscicapa splendens, Max. Beitr. iii. p. 906.

Pachyrhynchus Spixii, Sw. An. in Men. p. 289.

Bathmidurus variegatus, Cab. Orn. Not. p. 244 ; Bp. Consp. p. 181.

♂. *Niger*, pilei plumis æneo nitentibus : uropygio et corpore sub-
tus cinereis : scapularium, tectricum alarium et secundariorum
marginibus externis cum rectricum apicibus albis : rostro plum-
bescenti-nigro : pedibus nigris.

♀. *Rufa*, pileo ferrugineo : subtus dilutior, ochraceo induta (?).

Long. tota 6·0, alæ 3·1, caudæ 2·3.

Hab. South-eastern Brazil ; Rio de Janeiro ; Rio Grande do Sul
(Plant).

Mus. Brit.

Whether this and the preceding bird are really distinct, or merely local varieties of each other, it is difficult to say until a comparison can be made between a series of specimens of both sexes of each of them. I am not confident that the birds described as their respective females are really such. Dr. Cabanis has kept the two birds distinct, and I have followed his example—proposing to call the first *nigriventris*, as *niger* is preoccupied. In fact the whole difference of this species from the preceding consists in its cinereous uropygium and under plumage, and rather larger size. In the *nigriventris* the belly is nearly as black as the back. Spix's figure seems most like the northern species. Swainson has well distinguished the two birds in his 'Animals in Menageries,' pt. 2, under the names *niger* and *spixi*.

13. *PACHYRHAMPHUS MARGINATUS*.

Lanius atricapillus, Gm. S. N. (♂).

Todus marginatus, Licht. Doubl. p. 51 (♀).

Pachyrhynchus swainsoni, Jard. & Selb. Ill. Orn. et Sw. An. in
Men. p. 288.

Muscipeta marginata, Max. Beitr. iii. p. 909.

Pachyrhynchus marginatus, D'Orb. Voy. Ois. pl. 31. f. 2. p. 303.

Pachyrhynchus albifrons, Sw. An. in Men. p. 289.

Bathmidurus atricapillus, Cab. Orn. Not. p. 245.

Psaris marginata, Bp. Consp. p. 181.

♂. *Cinereus*, pileo nigro, fronte et loris albidis : interscapulio
partim nigro : subtus cinerascens-albus, ventre clariore : alis
caudaque nigris : tectricum et secundariorum alarium margi-
nibus externis cum rectricum apicibus albis : rostro plumbeo :
pedibus nigris.

♀. *Olivacea*, pileo rufo : alis caudaque nigricantibus, illarum
marginibus et rectricum apicibus pallide rufis : subtus flavi-
canti-olivacea.

Long. tota 5·75, alæ 2·8, caudæ 2·2.

Hab. Brazil ; Bahia (Licht.) ; Bolivia (D'Orb.) ; Eastern Peru ;
Rio Napo.

Mus. Brit., Paris., &c.

The back of the male of this bird is always varied with black ; but I have one specimen in my possession, otherwise not varying much in plumage, in which the whole interscapulum is black. This is perhaps Dr. Kaup's *Ps. marginatus minor* (P. Z. S. 1851, p. 48).

14. PACHYRHAMPHUS MAJOR.

Bathmidurus major, Cab. Orn. Not. p. 246.

Psaris major, Bp. Consp. p. 181.

Pachyrhampus marginatus?, Sclater, P. Z. S. 1856, p. 298.

♂. *Supra cinereus : dorso medio nigro aut nigro mixto : torque cervicali postico albo-griseo : pileo nitenti-nigro, linea frontali albida : scapularibus albis : alis nigris, tectricibus et secundariis albo limbatis : subtus albus cinereo tinctus ; cauda nigra rectricibus lateralibus late albo terminatis : rostro nigro-plumbeo : pedibus nigris.*

♀. *Supra castanea, pileo nigro : alis nigris castaneo marginatis : subtus pallide viridi-flavicans, lateribus rufo tinctis ; cauda nigra, rectricibus duabus mediis et ceterarum apicibus rufis.*

Long. 6·0, alæ 3·3, caudæ 2·4.

Hab. S. Mexico, Xalapa (Cab.) (Sallé).

Mus. Heineano et P. L. S.

This Mexican representative of *P. marginatus* may be easily recognized by its large size and the grey cervical collar between the black nape and the back. M. Sallé's specimens were procured near Xalapa, whence Dr. Cabanis's type, which was a female, also came. No description of the male bird has hitherto appeared.

15. PACHYRHAMPHUS ALBO-GRISEUS, sp. nov.

♂. *Supra cinereus, pileo cum nucha nitenti-nigris : linea frontali inter oculos alba : alis nigris, tectricibus et secundariis extus late albo marginatis : subtus albus, præcipue apud latera cinerascens tinctus : cauda nigra, rectricibus omnibus, sed harum extimis præcipue, late albo terminatis : rostro plumbeo : pedibus nigris.*

♀. *Saturate castanea, subtus valde dilutior, cinnamomescenti-ochracea. (?)*

Long. tota 5·5, alæ 3·0, caudæ 2·4.

Hab. New Grenada, Bogota.

Mus. P. L. S.

I possess an adult male specimen, and what, I think, is probably the female of this Becard, which is a close ally of the two preceding species. It is, I suppose, the New Grenadian representative of the form ; and, I confess, it is not without hesitation that I separate it specifically from *P. marginatus*. The differences are the further extension of the black over the nape of the neck, the entire want of black on the back, the more purely white colouring below, and the much deeper white terminations of the outer rectrices in the present species.

16. *PACHYRHAMPHUS RUFESCENS*.

Gobemouche roux de Cayenne, Buff. Pl. Enl. 453. f. 1 (?).

Muscicapa rufa, Bodd. Table d. Pl. Enl. (?).

Muscicapa rufescens, Gm. et Lath. (?).

Pachyrhynchus rufescens, Spix, Av. Bras. ii. pl. 46. f. 2.

Tityra castanea, Jard. & Selb. Ill. Orn. pl. x. f. 2.

Muscipeta aurantia, Max. Beitr. iii. p. 911 (♂ et ♀ descr. opt.).

Pachyrhynchus ruficeps, Sw. An. in Men. p. 288.

Bathmidurus melanoleucus (!), Cab. Orn. Not. p. 244 (partim).

Psaris melanoleucus, Bp. Consp. p. 181.

♂. *Rufo-castaneus, subtus dilutior, cinnamomeus : pileo subcris-
tato intensiore : vitta nuchali oculos utrinque jungente cinerea :
primarium apicibus nigricantibus : cauda unicolore castanea :
rostro corneo : pedibus nigris.*

♀. *Mari similis, sed paulo dilutior, pileo magis cinereo et remige
secunda, sicut semper in fœminis hujus generis, integra.*

Long. tota 5.5, alæ 2.9, caudæ 2.5.

Hab. Brazil, Para (*Spix*); South-eastern provinces (*P. Max.*).

Mus. Brit., Paris., &c.

I believe this Becard to present one of those exceptional cases (which not unfrequently occur in natural groups) of both sexes of a species, otherwise typical, having the characteristic colouring of the females of the other members of the genus. Like Dr. Cabanis, I for some time supposed that the present bird, which is by no means uncommon in collections, was the female of some black and white species. Dr. Cabanis has even gone so far as to prognosticate from a specimen which he supposed to be a young male in process of change, what the plumage of the adult male would be, and has named it *melanoleucus*. But having lately found that several specimens of these birds in supposed female attire have the second primary abnormally short (as is invariably the rule in the adult males of *Pachyrhynchus*), I am induced to believe that there is little difference in the coloration of the two sexes of this bird, and that Dr. Cabanis was in error. I may remark, that I have that accurate observer, Prince Maximilian of Neuwied, in my favour, for he describes the male and female of this species as nearly alike.

Vieillot's *Saltator melanoleucus*, identified by Prince Bonaparte and others with the supposed male of this species, is a *Lamprospiza*!

SCHEMA GEOGRAPHICUM AVIUM TITYRINARUM.

	Antilles. 1.	Mexico. 2.	Central America. 3.	New Grenada. 4.	Venezuela and Trinidad. 5.	Cayenne and Guiana. 6.	Eastern Peru. 7.	Bolivia. 8.	Paraguay. 9.	S.E. Brazil. 10.	N.E. Brazil. 11.
I. TITYRA.											
a. Tityra.											
1. cayana.....	*	*	*
2. brasiliensis.....	*	*	*	*
3. semifasciata.....	*	*
4. personata.....	...	*	*	*
b. Erator.											
5. inquisitrix	*	*	*	...	*
6. albitorques	*	*
II. PACHYRHAMPHUS.											
a. Platypsaris.											
1. validus.....	*	*	*
2. niger	*
3. pectoralis.....	*	*	*
4. roseicollis	*	*
5. aglaiae	*
6. latirostris.....	*
7. surinamus	*
b. Pachyrhamphus.											
8. viridis	*	*	...
9. cinereus	*	*	*
c. Callopsaris.											
10. versicolor	*
d. Bathmidurus.											
11. nigriventris	*	*	*
12. polychropterus	*	...
13. marginatus	*	*	...	*	*
14. major	*
15. albo-griseus.....	*
16. rufescens	*	*
	1	3	2	9	5	6	4	5	3	6	4

Mr. Tegetmeier laid before the members specimens illustrating the differences produced in the hens of the Common Pheasant and Domestic Fowl by disease or degeneration of the ovary.

The late Mr. Yarrell noticed that disease of the ovary in the hen Pheasant resulted in the assumption of the male plumage and voice. Mr. Tegetmeier exhibited a specimen of a game hen, that had become sterile from age, in which the plumage was completely changed to that of the male.

In cases of disease of the ovary in domestic hens, a different alteration ensues. The plumage remains perfectly unchanged, but the comb and wattles become extraordinarily developed, in many cases even surpassing those of the male bird in size. The birds crow like the males, and are popularly known as Hen-cocks. The alteration had been observed as resulting from melanosis of the ovary from cartilaginous degeneration, and from a generally diffused inflammation arising from the escape of an ovum from the oviduct.

May 12, 1857.

Dr. Gray, F.R.S., in the Chair.

The following papers were read:—

1. ON *PARUS MERIDIONALIS* AND SOME OTHER SPECIES MENTIONED IN THE CATALOGUE OF BIRDS COLLECTED BY M. SALLÉ IN SOUTHERN MEXICO. BY PHILIP L. SCLATER, M.A., F.L.S., ETC.

In the Catalogue of Sallé's Mexican Collection, given in these Proceedings for last July, I described a new species of Titmouse under the name of *Parus meridionalis*. Not having at that time within my reach specimens of *Parus atricapillus* of the United States, it was not without hesitation that I separated the Mexican species from that bird. I am now, however, able to exhibit to the Society specimens of *Parus atricapillus* which I obtained in North America last autumn, and I think that a comparison of them with the type of my *Parus meridionalis* (which M. Sallé has again kindly placed in my hands) leaves no doubt that these two *Parus* are, as I had anticipated, really distinct, although closely allied species. In its upper plumage *Parus meridionalis* differs from *P. atricapillus* in having the back deeper cinereous without any tinge of brown—the narrow outer edgings of the secondaries are brownish and not white, and the black does not extend so far down the nape. Below, the plumage is also much darker; the whole abdomen and crissum being of a nearly uniform color.

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form rather mouse-coloured cinereous, with a pale whitish medial line. In *Parus atricapillus* the whole middle of the belly is much lighter and more white, and the sides are deeply tinged with pale rufous.

There is not much difference in the size of the two species, but the tail of *Parus meridionalis* is slightly longer.

Mr. Gould's collection contains an example of *Parus meridionalis* also from Mexico.

With regard to other species contained in the same catalogue, I have to state that *Cyanocitta floridana* (sp. 135) is probably an immature bird of *C. ultramarina* (Temm.).

I have compared specimens of *Passerculus zonarius*, Bp. (sp. 187) with examples of *Peucea lincolni*, which I obtained in the United States, and can discover no difference between them, and I consider these two names to be synonymous.

The bird named *Coturniculus henslowii* (sp. 187), upon further comparison does not seem distinct from the ordinary *C. passerinus*, of which I also possess specimens from Guatemala.

2. ON THREE NEW SPECIES OF THE GENUS TODIROSTRUM.

BY PHILIP LUTLEY SCLATER, M.A., F.L.S., ETC.

(Aves, Pl. CXXV.)

Sir William Jardine has kindly lent me some specimens of birds of the genus *Todirostrum* out of a collection received by him a short time ago through Professor Jameson of Quito from the Rio Napo. They were obtained in that locality, as I have reason to believe, by Don Villavicencio, a Naturalist who was some time resident at Porto del Napo, on the Upper Rio Napo, where the Italian traveller Osculati mentions having seen him in 1847. Two of them appear to be certainly undescribed. The third is not in a very good state of preservation, but I think it may possibly be referable to Dr. Hartlaub's *T. rufilatum*.

1. TODIROSTRUM CALOPTERUM, n. s. (Pl. CXXV. fig. 1.)

Supra flavescenti-olivaceum; pileo et cauda nigris: alis nigris, harum tectricibus late flavis, campterio intense badio; secundariis ultimis extus flavicante limbatis: subtus flavam; gutture albo: tectricibus subalaribus flavidis: rostro nigro: pedibus pallidis.

Long. tota 3.6, alæ 1.9, caudæ 1.2.

Hab. In rep. Equatoriana in ripis fl. Napo.

Mus. Gul. Jardine, Baronetti.

This is a typical *Todirostrum*, but with the beak rather shorter and broader than in *T. cinereum*. The only known species which it at all resembles in colouring is *T. nigriceps*, mihi (P. Z. S. 1855, p. 76. pl. 84. fig. 1), from which it may be at once distinguished by the fine deep chestnut colouring of the bend of the wing. It is, I think, the most beautiful species of this group yet discovered.

2. TODIROSTRUM CAPITALE, n. s. (Pl. CXXV. fig. 2.)

Supra olivaceum, pileo rufo; alis caudaque nigris extus olivaceis, secundariis ultimis et caudæ rectricibus lateralibus in pogonio externo lactescenti-albo late limbatis, hoc colore extus tenuiter olivaceo marginato: subtus cinerascienti-album, medialiter albes-cens, ventre medio et tectricibus subalaribus flavicantibus: rostro superiore nigro, inferiore flavido, pedibus fuscis.

Long. tota 3·7, alæ 1·8, caudæ 1·2.

Hab. In rep. Equatoriana in ripis fl. Napo.

Mus. Gul. Jardine, Baronetti.

The rufous crown of this species distinguishes it from every one of its congeners except *T. ruficeps*, from which it may be separated by the want of the dark pectoral band, and other easily perceived characters.

The shape of the bill is typical, but rather broader and flatter than in *T. cinereum*.

I have also lately obtained two specimens of another species of this genus, not quite so typical in form or striking in plumage as the two last, but hardly to be placed without the limits of the group. This I propose to call

3. TODIROSTRUM EXILE, n. s. (Pl. CXXV. fig. 3.)

Supra olivaceum, alis caudaque fusco-nigris; illarum secundariis et tectricibus flavicanti-olivaceis, hujus rectricibus olivaceo extus marginatis: loris et capitis lateribus fusco-albidis: subtus margaritaceo-album, lateribus flavido tinctis; gutture et pectore striis paucis elongatis fuscis obsoletissime flammulatis: rostri nigri basi pallida, tarsis gracilibus et cum pedibus colore carneis.

Long. tota 3·5, alæ 1·7, caudæ 2·6.

Hab. In Nova Grenada.

The first example of this species that came under my notice was received from MM. Verreaux of Paris in 1854. It is labelled "New Grenada." I purchased a second not quite mature from Mr. Hurst of Albany in the State of New York. A third is in the British Museum, and is evidently a Bogota skin. The bill of this *Todirostrum* is smaller than in the ordinary run of the species, but of nearly the same form, though not quite so flat. The tail is proportionately rather longer, the tarsi very slender.

Besides the three lastly described, I am acquainted with sixteen other species commonly referred to the genus *Todirostrum*, namely—

1. *TOD. CINEREUM* (L.). — *Todus melanocephalus*, Spix, Av. Bras. ii. pl. 9. f. 2; Desm. Tod. pl. 68: ex Boliv. Bras. Sept. Or. et Mer.; Guiana, Cayenne; Venezuela; ins. Trinit.; Nov. Grenada; Bogota; S. Martha; America Centrali et Mexico Meridionali!

2. *TOD. MACULATUM* (Desm.), Desm. Man. et Tod. pl. 70 (*Todus cinereus*, Spix): ex Guiana, Cayenne, et Brasil. Sept.

3. *TOD. AURICULARE* (Vieill.), ex Brasil. Or.
4. *TOD. GRANADENSE*, Hartl. (*pectorale*, Kp.), ex Bogota.
5. *TOD. RUFICEPS*, Kp. (*multicolor*, Strickl.), ex Bogota.
6. *TOD. POLIOCEPHALUM* (Max.), Beitr. iii. p. 964 (*flavifrons*, Lafr.), ex Brasil.
7. *TOD. GULARE* (Temmm.), Pl. Col. 167. f. 1, ex Brasilia.
8. *TOD. SQUAMICRISTATUM*, Lafr., R. Z. 1846, p. 363, ex Bogota.
9. *TOD. NIGRICEPS*, mihi, P. Z. S. 1855, p. 66. pl. 84. f. 1, ex S. Martha.
10. *TOD. GRACILIPES*, mihi, P. Z. S. 1855, p. 149, ex Bogota.
11. *TOD. CINEREIGULARE*, mihi, P. Z. S. 1856, p. 295, ex Mexico.
12. *TOD. CHRYSOCROTAPHUM*, Strickl. Contr. Orn. 1850, p. 48. pl. 49, ex Peruv. Orient.
13. *TOD. GALEATUM* (Bodd.) (Pl. Enl. 391. f. 1.—*Mot. cristata*, Gm.; *Euscarthmus cristatus*, Bp.; *Tod. spiciferum*, Lafr. et P. Z. S. 1855, pl. lxxxiv. f. 2), ex Cayenne et fl. Amazon.
14. *TOD. SYLVIA* (Desm.), Man. et Tod. pl. 69 (Mus. Paris.).
15. *TOD. FUMIFRONS*, Hartl. Journ. f. Orn. 1853, p. 35, ex Brasil.
16. *T. RUFILATUM*, Hartl. Journ. f. Orn. 1855, p. 98, ex Brasil.

Besides these, the following species have been described, and appear to rest on good authority, but I have not yet met with specimens of them :—

1. *T. ECAUDATUM*, Lafr. et D'Orb., ex Bolivia.
2. *T. MARGARITACEIVENTRE*, Lafr. et D'Orb., ex Bolivia.
3. *T. FURCATUM*, Lafr., ex Brasil.
4. *T. PALPEBROSUM*, Lafr., ex Brasil. (?)
5. *T. STRIATICOLLE*, Lafr., ex Bahia.
6. *TRICCUS CRINITUS*, Burm. Syst. Ueb. ii. 496, ex Brasil.

3. NOTES ON THE HABITS OF SOME BIRDS OBSERVED IN THE PLAINS OF N.W. INDIA, IN 1849. BY THE REV. T. PHILIPPS, BAPTIST MISSIONARY. COMMUNICATED BY FREDERIC MOORE*.

PART I.

1. *MILVUS GOVINDA*, Sykes. The common Indian Kite.

This bird, like all the Kites, soars at various heights in most graceful circles, but generally looking out for prey. When it alights on a wall or house, it utters a tremulous shrill cry. It is very cowardly, for though it will carry off parrots and young chickens, it is afraid of the crow, sparrow-hawk, &c. It will allow crows to pull to pieces a bit of meat before it, which it evidently is desirous to obtain.

2. *AQUILA IMPERIALIS*, Bechst. Native name, *Jumbiz*.

I shot a specimen of this Eagle in a lonely tree, where it was perched with its mate. When killed, it had a half-digested rat in its stomach. The tendons of the skin were so extremely strong as to make its skinning a very slow and difficult process.

I once saw this bird fly off with a partridge which I was on the point of shooting, and after a while managed to bring both down, and found that whilst flying, it had gutted the partridge and partly devoured its entrails. It sometimes seizes hares, with which, if very large and heavy, it can only rise about a yard from the ground; it then flies very slowly off; frequently some of the farmers may be seen running after and frightening it to relinquish its prey.

The *Jumbiz* will kill and eat half-grown peafowls. They often take away a grown fowl. I once observed it seize a tame half-grown peafowl which was flying down from a tree, and almost at the same moment the captor was attacked by another *Jumbiz*, and the whole fell to the ground together; running up, I found that the first bird had its wing broken, and could not fly away.

3. *HÆMATORNIS CHEELA*, Daudin.

I shot a specimen that was sitting on the top of a tree on the outskirts of a grove, and quietly surveying the country in a motionless posture. In the rainy and cold seasons it may be seen skimming over the corn-fields in search of reptiles and field-mice. It was called *Sikra* by the natives.

4. *HALIASTUR INDUS*, Bodd. The Brahminy Kite.

"This bird is amongst the first objects which attract the eye of a stranger, for they swarm about the shipping at Calcutta, and are useful in removing any offal which may be thrown away; but though their usual food is carrion, yet they kill fish, and not unfrequently carry off a snipe which the sportsman has levelled."—*C. W. Smith's Notes*.

* The names of the following birds have been determined by comparing the descriptions made in India by Mr. Philipps with specimens in the Museum of the Hon. East India Company.—F. M.

5. *BAZA LOPHOTES*, Cuv. The Cohy Falcon.

The Cohy Falcon is one of the most beautiful of the Falcon race, and is a high caste bird. Its posture is erect, its plumage glossy, form compact, and manner dauntless; while the crest on the head adds much to its grace and beauty.

Mr. C. W. Smith in his 'Notes' says, "This is a scarce bird, and a specimen was sent to me by a native gentleman, and who acquainted me that it had not been seen more than once by the oldest Shikari."

6. *ATHENE BRAMA*, Temm. Native name, *Khukhusat*.

At a village a small distance from Muttra, a pair of these birds had taken up their abode in some low bushy trees growing at the entrance of the village, and were seen hopping and flying about in broad daylight and quite able to see us; which indicates their diurnal habits and familiarity.

I have seen this bird in various places in broad daylight at sunrise. I once observed it fly down from the top of a tree on the high road, and, picking up an insect, fly up again; this insect it held in its claws to eat, like a parrot; seeing me, it bent down its head, as all owls do; and though I frightened it once or twice, it would not leave the tree, but only flew to another bough. Its hunting in daylight shows it to approach the diurnal Owls.

At Brindabun I observed a pair huddled together at the end of a bough exactly over the tent. They slept the greater part of the day. One let fall its dung, which was as hard as a pellet, on my arm. Towards the decline of the sun, or between four and five o'clock, they woke up, and on perceiving that they were observed, gave one good stare and flew to another bough; and on being again looked at some short while afterwards, they flew to a low tree at some distance off. Its hoot is a plain single sound of *hoo*, not very loud, but very distinct.

7. *ATHENE CUCULOIDES*, Vigors.

I once shot a specimen of this Owl in a garden, where a pair had taken up their abode in a dense and lofty tree. In the stomach I found a small lizard, two centipedes, a whole beetle, and fragments of two others.

8. *BUBO BENGALENSIS*, Franklin.

This species is very common in the plains, and is heard wherever there are tall dense trees, at night. A pair had taken up their abode in the ancient tamarind trees behind the Kazi's garden. Having been once fired at, they are rather shy on perceiving that they are noticed.

This Owl looks exactly like a huge cat when seen in a tree; the first one that I saw was sitting in a low tree in an orchard, and allowed us to gaze at it in the dusk for some time. We could hardly tell until it flew whether it was a cat or owl.

Its voice is very different from the other owls here, being *hū, hū*,

हू, हूहूहू. This is generally replied to by its companion. When looking down from a lofty tree, it points its ears forward, just like a cat or horse gazing intently on anything.

9. STRIX JANANICA, De Wurm.

This Owl lives in long grass, and is to be found in abundance some miles from Hodul. They may often be put up and chased by hawks. They fly but a very short distance.

10. MEROPS VIRIDIS, Linn. Native name, *Hurrial* or *Putringa*.

This bird abounds in the neighbourhood of Muttra. Its flight consists of short rapid jerks, and a quick gliding motion, and it generally returns to the same twig from whence it set out. Sometimes several of them may be seen wallowing in the dust on the high road on a sunny morning. It feeds on insects, and builds its nest in the high banks of the neighbourhood. Its nest is in a very deep horizontal hole in perpendicular banks of hard earth, but often so low as to be within reach of the hand. From this it appears, that whilst they guard against other birds, snakes, and squirrels effectually, they fear not man. These nests are generally on the high road-side, and the birds fly in and out unhesitatingly.

11. MEROPS PHILIPPINUS, Linn.

This bird utters a sharp whistle whilst flying, and also when perched. It flies for a much longer period and in a different manner to *M. viridis*, by taking several kite-like sweeps round and above its tree, and keeping on the wing for nearly a minute. It builds its nest in the same manner. There is a pair now (May 31st) near my house. [June 29th, 1849, killed one of a flock which are breeding in an old rampart opposite my house, fronting the high road. Irides vermilion.]

Referring to the Urdoo names of the different species of the Bee-eater of India, it may be remarked, that the natives class them under two heads:—*Putringas* and *Hurewahs* (Hurrials), each consisting of two descriptions of birds; the first of *Chota* and *Bura Putringa*, and the second of *Chota* and *Bura Hurewah*. The *Bura Putringa* is also called *Goolal*. The *Putringas*, it is to be observed, are common all over India; while the *Hurewahs* are confined entirely to Bengal, and never seen above Barilly in a wild state.

The *Hurewahs* are of a size between the two *Putringas*, and the two species are distinguished from each other by a slight difference in size, and by the larger one having a yellow spot on the top of the head. The *Hurewahs* are considered good singing birds, and are brought up as such by the native bird-fanciers of the Lower Provinces, and who occasionally bring them up to Muttra for sale. These birds must be taken very young from the nest; and they require as much care as most cage-birds do in their rearing and education as singing birds. The *Putringas*, on the other hand, are not good singing birds, and are therefore never caged or brought up as such.

The *Putringa* is also a very watchful bird. On the approach of a hawk, he immediately mounts into the air and utters a shrill muttering noise, which is well understood and taken up by all the other birds, who immediately fly to cover.

12. *HIRUNDO FILIFERA*, Stephens.

I have seen this beautiful Swallow in my own compound after rain, and also sporting over a stagnant part of the Jumna at Brindabun. Its nest was under a projecting part of the building overhanging the water.

13. *CYPSELUS AFFINIS*, J. E. Gray. Native name, *Ababil*.

Very common in the neighbourhood of Muttra. I have caught many specimens by simply standing at the bottom of a staircase in which were numbers of their nests, and waving the hat as they flew out, when they were instantly entangled. They appear half-blind or stupid after daylight. They quite fill up with feathers, &c., any hole in the wall for their nest, but when they build in the corner of a building they make a very thin cup-shaped nest. These nests they fasten one to another. The materials in the latter case appear glued together. Their claws are excessively sharp, and hold on to the flesh with desperate tenacity.

14. *CAPRIMULGUS* —. Native name, *Chapka*.

These secrete themselves during the day at the roots of bushes, and fly out at dusk. They take such short and quick turns in the air, that a hawk can only with great effort catch them. The Sparrowhawk alone is successful in this case. The natives believe that if it settles on a cow she becomes ill, and her milk dries up.

15. *HALCYON SMYRNENSIS*, Linn. Native name, *Kilkila*.

This is found near ponds and small streams. Sometimes it may be seen sitting solitary on the top of a tree or the corner of a cottage, and at short intervals utters a shrill tremulous sound of seven or eight syllables, *kililililili*, like a wire which, having been struck, continues to vibrate. It often utters this cry before break of day, and sometimes during the night.

In the dry weather it sits near the water-courses in gardens, and watches for insects of any sort in the damp ground beneath dense fruit trees. I have seen it twice alight and devour an insect in such places.

I have found this species breeding in the Kazi's garden, and observed the female feeding her full-grown young one near the hole where the nest was. It waited for its food on the bough of a tree.

June 1st.—Observed the male treading the female, which is done in a similar manner as in the ducks. The habits of this bird bear comparison with aquatic birds only in a few instances. Its organization is, according to ornithologists, that of land birds, though the moderns have classed it with water birds, because perhaps they fre-

quent water, which however seems only because they draw their food from that element. The *Kilkila* is very common throughout the N.W. Provinces, attaching itself generally to pools of water, but frequently also to other places. I have often seen a pair attach themselves to my compound, and sit watching for hours at a time on some stick projecting from a "chopper" or the branch of a tree in the compound, for lizards and mice, which I have seen them fly at and catch, and swallow after killing them by beating them against the stick they perch on.

This bird becomes very familiar where it is not molested. It is easily caught with lime-twigs baited with a mouse or a mole-cricket.

16. *CERYLE VARIA*, Strickl. Native name, *Sufid Kilkila*.

This Kingfisher is very numerous, and is evidently a more retired bird than the preceding, and is only to be seen over rivers and large lakes, and seldom, if ever, near the habitations of men; over the former it may be seen hovering with its wings in rapid motion, balancing itself in the air whilst watching the fish, on which it plunges with the swiftness of lightning. If successful, it flies to the nearest bank and eats its prey at leisure; if not, it flies on a short distance, with its eyes fixed on the water till another fish attracts its attention, when it repeats its former manoeuvre. *Koureealah* is another name applied by the natives to this bird.

17. *TCHITREA PARADISI*, Linn. Native name, *Taklah*.

Dr. Murray says that the chestnut and the white bird are the same species in different stages of growth; that the chestnut is the colour of the young one, and that when they moult they become white. The proof he gives is, that he has shot specimens during their moult, when they are partly clothed in their old chestnut, and partly in the new white dress.

I saw a pair, one white and the other cinnamon, following each other, and I should say they were male and female.

This bird can elevate its crest at pleasure. In general it is recumbent.

18. *PERICROCROTUS SPECIOSUS*, Lath. Native name, *Shah-Sakhi-Kapi*.

These birds are very restless, and frequent the tops of high trees, and ever chasing their prey. They generally fly in pairs. The natives assert that the male has seven females in his train, whence it has the above name, and also *Shah Saheli Ka-jhumka*.

19. *RHIPIDURA ALBO-FRONTATA*, Frankl. Native name, *Sham-chiri*.

Extremely common in Brindabun, and I have seen it on the banks of the Jumna. It is very volatile and agile. It has a loud clear-chanting whistle.

20. *DICRURUS MACROCERCUS*, Vieill. Native name, *Bojunga*.

This bird may be seen everywhere flitting about trees, and on the backs of cattle. They abound in great numbers at the commencement of the high land on the Brindabun road. It is sometimes seen contending with the Hoopoe for the same insect. I saw one deliberately pulling to pieces a large insect which it held tight to the branch with its claw; the remaining piece it took in its bill and by a slight effort swallowed it. I once heard, about four o'clock in the morning and whilst yet dusk, several *Bojungas* making a great whistling noise and replying to each other, and was informed upon inquiry, that they are accustomed to have great fun at this hour, flying about in antics. I would remark that the *Bojunga* and the *Bhringraj* (*D. paradiseus*) are different species of the same genus of birds; the latter is an inhabitant apparently of the Nepal Hills, whence only it is brought down as a singing bird and sold at a fair near Bulubhut held in January every year. The *Bhringraj* is never to be seen in the plains, at least of the N.W. Provinces, in its wild state: it may easily be distinguished from the *Bojunga* by its having a crest of feathers on its head, and being more than double the size of the former, though the shape, plumage (except the top-knot), and perhaps habits are the same. The *Bojunga* probably inhabits the mountainous parts of the country as well as the plains, but certainly the *Bhringraj* confines itself entirely to the hills. The *Thampal*, which is another native name for the *Bojunga*, is unquestionably common enough in the N.W. Provinces, being found wherever there are large trees. It is fond of positions commanding extensive views: the top of a high tree is a favourite perch, where it performs the part of a sentinel in watching and giving notice of the approach of an unwelcome visitor. It has some peculiar loud notes of alarm, which are well understood by the less watchful but more peaceable portion of the feathered race. The *Thampal* has an innate dislike to the vicinity of all Raptorial birds, and will, without any apparent provocation, attack and drive these away from its immediate neighbourhood; but it is not until the breeding season arrives, which is from May to July and August, that this aversion and its natural pugnacity come out in full force. From the moment the nest is built, the male bird becomes extremely jealous of any encroachments upon the precincts of his dwelling, and during incubation his vigilance and ferocity are extreme. No sooner does he perceive the advance of a hawk, &c., than, starting from his high perch, he launches into the air to meet it. As all birds seem to dread an encounter with this dauntless little champion, the hawk is often seen to alter its course immediately on observing this challenge; but should it have the hardihood to continue the original direction of its flight, it certainly pays the penalty of its temerity; for the *Thampal*, mounting into the air a short distance above it, inflicts such smart blows, sometimes fixing on its back with his claws and beak for some seconds, as compels the hawk to beat a hasty retreat to some cover. Occasionally the female will turn out to assist the male in beating off a bird that approaches too near her nest. The following instance

of cunning in the *Thampal* is worthy of record :—Riding slowly across the country one fine morning in pursuit of game, I perceived a *Thampal* on a projecting dry branch of a large tree, while at a short distance were a number of different kinds of birds in a field in search of food. Presently I saw a “Chehee” or “Gilgilla” spring up and catch a locust in the act of flying away; the insect was too large to be easily subdued by the bird, and struggled hard to get away; it did escape once or twice from the bird, but was as often retaken. The *Thampal* had evidently observed the locust’s struggles, and had once or twice tried to take it on its escape from the bird, but in vain. After one of these attempts he returned quietly to his perch, to all appearance giving up the idea of another similar trial. He had not, however, been there a few seconds, when—perhaps having revolved in his *mind* that the morsel was too nice a one to be relinquished without one more attempt—he suddenly uttered some of those shrill notes which indicate the approach of a hawk. So sudden was the alarm, and given with an intensity denoting imminent danger, that it sent the poor birds screaming with fright to a covert hard by; the locust, being abandoned in the panic, was taken off as *lawful* booty by the *Thampal*. I satisfied myself that no hawk had been or was in the vicinity, before I left the spot; and am confident the alarm was a *ruse* on the part of the *Thampal* to get at the locust.

21. LANIUS LAHTORA, Sykes. Native name, *Sufid Latora*.

This Shrike is common enough throughout the N.W. Provinces, and is one of the sentinels which watch and give notice of the approach of Raptorial birds, hawks in particular. I have never seen it attempting to attack any large bird, but I have on one or two occasions seen it pursue and capture small birds in the fields. It flew after them round and into the bushes before it could effect the capture. A friend of mine (Mr. Blewitt) tells me he has also seen the same thing done by a *Latora* once or twice, and I mention this here because I believe it has been doubted if this bird preys thus on the smaller birds. This, however, I am inclined to believe it does but seldom, and only from extremity of hunger; its more usual food being crickets, lizards, &c., when they abound. I have heard that this Shrike has been trained, but could never be made to catch a bird larger than a sparrow. It is, however, used in another curious way for the purpose of catching other birds. The bird-catcher takes a *Latora*, and running a string through its nostrils, runs the same string through those of a common starling, and drawing the string so as to bring the beaks of the two birds nearly together, joins it in a knot. In this state one of the two birds is fastened to a peg on the ground in a field, round which spot a circle of lime-twigs is set up. As soon as the man withdraws himself, these two birds try to extricate themselves, thus making a great noise, which attracts all sorts of birds, and which try to separate the supposed belligerents, but who in flying about come in contact with the lime-twigs, and are caught. The *Latora* is considered among the birds of omen with the Hindoos.

22. *LANIUS ERYTHRONOTUS*, Vigors. Native name, *Pila Latora*.

Is common about Muttra, seated on the top of the castor-oil tree, and screams with a shrill single sound, generally repeated with one high and one low note, like *Qeek, qeek*. It utters various cries, apparently in imitation of other birds. It always seats itself on the highest or outermost branch, so as to command a wide view. This bird is inferior in courage to the *Sufid Latora*, and has never been known to attack live birds as prey, it living entirely on insects, &c.

23. *TEPHRODORNIS PONDICERIANUS*.

Takes very short flights, and is not shy; hops from twig to twig, and takes surveys around the tree by twisting its head in every direction. Having spied an insect of a soft kind, it seized it, then laying it down, deliberately ate it.

I observed a specimen hunting in various trees. It was very tame, and though often seated quietly for some seconds, it was never idle, its eyes and head being always on the look-out for insects. It hunts for insects in and under leaves, and with its very sharp bill picks these out with ease. Having discovered the chrysalis of some insect in its web attached to a leaf, it tugged vigorously at it till it was detached; it then devoured it. It did not attempt to catch flies.

24. *MALACOCERCUS CANORUS*, Linn. Native name, *Ghanghai*.

This is most fearless in attacking the hawk. I once observed a friend fly his hawk at a partridge, and as it passed by a flock of these birds, they spied and attacked it after it had secured the partridge. They so severely treated the bird with their beaks, that it was glad to relinquish its prey and fly for its life. It was so frightened, that having once taken shelter in a tree, it was with the greatest difficulty brought back again to the fist. Its head remained swollen for a week, and afterwards it dreaded the sight of one of these birds.

On another occasion I observed a number of these birds actually kill a sparrow-hawk.

25. *MALACOCERCUS* (? *CAUDATUS*, Dum.). Native name, *Peng*.

This bird is very common here. Its habit, size and colour distinguish it from the *Bara Podna*. The *Podna* lives in the trees, and there feeds on insects; the *Peng* hunts only on the ground. The first has the lively motions of the small *Podna*; the other intently surveys the ground before he pecks, then hops a little distance with several great bounds, and then pecks again. The colour of the belly of the first is pure white, of the second only the chin. The *Peng* is also by far the larger of the two. The voice of the *Peng* is very peculiar, and at once distinguishes it from all other birds: it is a low under-toned warbling whistle, which it very often utters. A pair I have in confinement are all day long jumping from side to side of their aviary and responding to each other. They bear confinement very well, and feed on grain. One of them has a malformation of his upper mandible, which is bent down on one side of the lower; he manages, however, to eat and thrive.

When alarmed and retreating from an intruder, they run by a succession of long rapid hops; and when they have retreated some distance, their appearance is very much like that of a large field-rat, both as to waddling, motion, colour and shape; the long tail always dragging on the ground, very much favours the deception. When they fly to a distant part of the same field, they go so very near the ground, that if their wings were not seen in motion you might fancy them running or skimming the surface very swiftly. It generally frequents the bottoms of hedges and open fields, in the morning and evening.

26. *PYCNONOTUS PYGÆUS*, Hodgson.

Syn. *Pyc. bengalensis*, Blyth. Native name, *Bulbul*.

Common in the neighbourhood of Muttra. It is sold in great numbers in Delhi, and kept both for singing and fighting; the latter it is taught to do in the following manner:—The birds are placed on a string, to which they are tied, having a small range, in sight of each other. They are thus fed. When they wish to teach them to fight, they are kept hungry, and then are brought so near, that at the extent of their tether their beaks almost touch; the keeper then places a little food on his finger between the two birds. As both are hungry, they become indignant at the chance of each other getting the food, and of course show fight, and if let loose will immediately commence.

This bird is also taught to perch on the finger. A string is tied round its body and under its wings, and is thus kept prisoner without a cage.

The Bulbul sits on a solitary branch early in the morning, and keeps uttering a cry, consisting of two sounds, thus *Kee kua*. I have seen them hunting in pairs over the branches of large trees. Sometimes it feeds on the ground. I have found the nest of this bird in June, in an orange-bush, 4 feet from the ground. The nest was small, round, and contained four brown-spotted eggs.

It is remarkable that these birds are attracted by any very bright red or scarlet-coloured fruit. I have seen them occasionally caught by boys with a ripe cherry hung up near a lime-twigg or other trap, to which a Bulbul has been enticed by the colour of the fruit.

Another native name given to these birds is *Gul-doom*, with reference, no doubt, to the scarlet patch under the tail.

I saw a specimen of this bird perfectly white all over, excepting the scarlet patch under the tail. It was brought in a cage from Barilly, and the owner gave the history of the bird thus:—He was one day going about the gardens near Barilly in search of young birds (being a bird-fancier), when he saw a crow fly across his path with a young unfledged Bulbul, followed close by the parent birds; as the crow flew close over his head, the man raised his hands and made a noise, which frightened the crow; the young bird was dropped, and being picked up was afterwards reared, when to the astonishment

of all that saw it, the young bird put forth white plumage, which it renewed, of the same snow-white colour every moulting season.

Query. Could any fright received by the nestling on being carried off by the crow have produced this effect on the plumage?

27. *PYCTORNIS SINENSIS*, Gmel.* Native name, *Bara Podna*.

This is an elegant little bird, which I have often observed in my garden. It lives on insects, and spreads out its tail like a fan when flying. Mr. C. J. Davis of Agra remarks that "this is the bird said to support the heavens by its legs, lest it fall." (See Shakespeare.) It generally builds in the Banyan tree.

28. *ORIOLOUS KUNDOO*, Sykes.

Breeds here in the rainy season, and may frequently be observed frequenting the gardens in the neighbourhood.

29. *COPSYCHUS SAULARIS*, Linn. Native name, *Dayer*.

This pretty singing bird is much prized by the Mussulmen, who cover up its cage, and feed it with expensive delicacies. Its food is made of roast grain-meal, ghi and spices. It frequents the lower branches of trees, and catches flying insects. I have observed it hunting on the ground in the shade of trees and bushes for soft insects, flying or creeping.

30. *KITTACINCLA MACROURA*, Gmel. Native name, *Shámá*.

May be observed early in the morning perched on walls, low trees and mounds, singing very sweetly. It builds in old walls, holes in houses, &c.

Mr. Davis says that the *Shámá* will sometimes imitate other birds, and that one in his compound, which had her nest near his poultry yard, used to imitate exactly the crowing of the cock, the call of a partridge, a kite and the Tuti (*Loxia rosea*). When caged it will imitate any other singing bird placed near it. It lays its eggs in the hot weather.

31. ~~THAMNOBIA~~ *FULICATA*, Linn. Native name, *Kalchiri*.

Feeds on insects, as black and white ants. It constantly utters its sharp pleasant twitter when jumping about. Its note is *twi a twi a twi*, ending in *queck*. It builds in holes in walls, &c. When the male is courting, he swells himself out, and especially his red under tail-coverts, and erects his tail perpendicular. He then flies with a whirring sound.

32. *PRATINCOLA CAPRATA*, Linn. Native name, *Pidha*.

This bird abounds here at the close of the rains, and may be seen perched on the tops of the *bajra* and *joar* when nearly ripe. It utters a sharp rapid *whirr*, and has a song also. They answer each other.

* Syn. *Timalia hypoleuca*, Frankl.

33. *ORTHOTOMUS LONGICAUDA*, Gmel.

May often be observed on low bushes and on the ground, but also often to be seen in the tops of low thorny trees. It feeds on small tender caterpillars and grasshoppers, with which, when obtained, it flies to a tree above to eat. If it notices any person watching, it will hop down and return the compliment by inquisitively looking, first with one eye, then with the other, at the stranger, and at a very short distance, uttering at the same time a loud chirp. Having satisfied itself, it flies to another tree. This I have repeatedly observed.

34. *BUDYTES VIRIDIS*, Gmel. Native name, *Pila Mamola*.

This is a much rarer bird than *Motacilla luzoniensis*, and is not so active when on the ground; it remains more in one place, and does not wag the tail so much. I have never observed more than one pair together.

35. *NEMORICOLA INDICA*, Gmel. Native name, *Mamola*.

This may be observed in abundance at Brindabun in flocks of six or eight. They prefer hunting in damp grass in the open fields in the morning.

36. *CALANDRELLA BRACHYDACTYLA*, Temm. Native name, *Bhagera*.

Observed here in the cold season only.

37. *ALAUDA CHENDOOLA*, Frankl. Native name, *Chandul*.

This bird is highly prized by bird-fanciers in India, and great care is taken of it, as it has a very fine voice, and is taught to sing for a greater portion of the night. A faquir, near the mosque in the centre of the city, keeps all kinds of Larks in neat brass-wire cages.

The Chandul rises into the air and sings all night till daybreak during the rains.

38. *MIRAFRA ASSAMICA*, M'Clelland. Native name, *Bhatul*.

Common here, and may be observed in the morning and evening perched on a naked bank, and there pouring forth for a long time its song, which consists of about eight notes, the first six very quickly repeated and the two last slowly, thus—*twée twée twée twée twée twée twée twée twée twée*. It breeds here, as I have found the young but just fledged. It runs crouching very near the ground, and hides itself behind anything that offers.

39. *PYRRHULAUDA GRISEA*, Scop. Native names, *Dabuk Chari* and *Duila* (Davis).

This bird builds its nest on the ground under a tuft of grass. The birds are nearly of the same colour as the ground, and they sit motionless until you almost put your foot on them. In running about they crouch and go a few inches at a time, whence their name

of Crouchers. The female bird on the nest is only discoverable by the eye.

40. *PASSER INDICA*, J. et S. Native name, *Gourya*.

Lays four eggs, white speckled with brown. The nest is composed of grass, hemp, and lined inside with large soft feathers. I have observed them throwing out their dung from the nest with their beaks.

41. *PLOCEUS BAYA*, Blyth. Native name, *Baya*.

The Baya arrives in the neighbourhood of Muttra in the hot weather, and begins to build during the rains. It would seem that they preferred those trees which, from any cause, are most inaccessible. Thus, in this neighbourhood, they suspend their nests from the Babul (*Mimosa arabica*), the terrible thorns of which keep all intruders at a distance; but, however, where palm-trees abound, they always select them, as being quite inaccessible, especially at the extreme tips of the leaves, where they generally suspend their nest. The nest is generally commenced from the top, the birds forming a circle like a hoop, on which they sit and swing while working; the top of the hoop is gradually widened, so as at last to form a dome with two supports; and thus the work goes on, till the whole dome has come to the length of the bottom of the hoop: there the nest begins to be formed into two compartments; on one side of the hoop the nest itself is placed, the other side being formed into an entrance.

They build the nest with one kind of dry grass, and during its formation you may observe them walking over the outside of the nest, prying about in every direction, and here and there tightening a fibre by seizing it with their beak and moving their head to and fro. They do not seem in any great hurry to complete the nest, but are very anxious to have it the proper shape, and, I suppose, sufficiently water-tight: indeed, no form could be better devised for a bird which builds only in the rainy season. I have observed them suspend the making of the nest for a month after the first few showers till the heavy rains begin to descend. They often take the liberty to hop on to a neighbour's nest and look about it, but never rob it of materials. Sometimes the high wind shakes down the nest, if not attached sufficiently strong. One bird I observed commencing its nest from the bottom, resting it on a twig having plenty of leaves.

The Bayas are very tame, and will allow you to stand under the tree whilst they are making their nests.

42. *MUNIA AMANDAVA*, Linn. Native name, *Lál* or *Lal Munia*.

This is sold here during the rainy season for about two annas each. Many Rajahs keep men to teach these little creatures to fight. Their note is very pretty, when caged. They pass the winter with difficulty, and often die of cold. The only way to preserve them is to provide them with the nest of the Baya (*Ploceus*), into which they creep and huddle together. They are very easily caught in traps in which a Lal is confined.

43. *CARPODACUS ERYTHRINUS*, Pallas. Native name, *Tuti*.

This comes from the hills in the spring, and feeds on the mulberry. It is caught by the natives in nets, before which two or three decoys are tied.

44. *STURNIA PAGODARUM*, Gmelin. Native name, *Pabiya Pawi*.

A very common bird. Elegant in shape and colour. Sings sweetly and is often caged. It is docile and hardy, and will imitate any other bird placed near it. It talks like a *Munia*, but with a shriller note. I observed it on May 31st building its nest in the hole of a tree close to a bridge.

45. *STURNUS VULGARIS*, Linn. Native name, *Telia* or *Nakhshi Telia*.

Generally appears in great flocks in the neighbourhood of Muttra in the cold weather.

The name *Telia* given to this bird and the *Pastor roseus* is most likely derived from Til (oil seed), which they are very fond of.

46. *STURNOPASTOR CONTRA*, Linn. Native name, *Ablaka*.

This builds a rather large nest in a conspicuous situation on trees of moderate height. It is somewhat shy.

47. *ACRIDOTHERES TRISTIS*, Linn. Native name, *Maina*.

May be observed in the cold weather crowding together on the Babul trees. They have several notes: one is *praiikh, praiikh*, another when flying is *twee, twee*. They may be seen of a morning feeding in the open fields upon white-ants. It is frequently caged and taught to talk, which it does tolerably well.

48. *CORVUS SPLENDENS*, Vieill.

The sagacity and vigilance of this predatory bird is too well known to require much in illustration of its habits; but I have too often myself been amused by witnessing the tricks, to think some short account of the manner in which this exceedingly cunning bird is caught by the natives, would not prove uninteresting to the reader of these notes. To any one conversant with the customs of this country (India) I need not say that Crows, as well as several other kinds of birds, are in great request at large cities for "Sudga" or "Ootarus" (ransoms) for the sick. Hence the necessity with bird-catchers of having a constant and well-regulated supply on hand, and as a Crow can seldom be tricked twice in the same manner, the bird-catchers have recourse to various methods of entrapping him. One of them is this:—Feeding Crows on certain occasions forms part of a religious ceremony with the Hindoos, and this share of the business is generally taken up by the women, with whom, accordingly, Crows become very familiar, nay, sometimes so bold as to take the food from their hands. Taking advantage of this familiarity with the women of the country, I have frequently seen a bird-catcher attire himself

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in the garb of a Hindoo female, and closely veiling his face and beard with the "Chadir," issue forth with a *Thaler* loaded with sweet rice in his hand to invite Crows to a (supposed) feast! This invitation consists of throwing a few grains of the rice to every Crow met on the way, and thus a flock is soon collected round the supposed woman, when the bird-catcher proceeds to his net, still throwing out a few grains of rice now and then to the Crows, who now follow him close. Reaching his net—which, by-the-bye, must be set at night and carefully concealed under dust and sand, otherwise the whole plan would fail,—he heaps the rice on a spot surrounded by the hidden net, walks to the end of a string attached to the net, and as all the Crows are now very busy at devouring the feast, he suddenly draws the net over his victims. I need hardly remark that in the manner of laying the net, and in concealing his person, the bird-catcher must be exceedingly cautious, for should the least suspicion be created by any discovery, the farce would be at an end. The very arms and feet of the man must be concealed, and the sight of a beard would most certainly send all the Crows flying in a moment. There are several other ways of catching these birds.

49. *CORVUS CULMINATUS*, Sykes. Native name, *Pahari-kawa*.

The habits of this are tolerably well known.

50. *DENDROCITTA RUFA*, Scopoli. Native name, *Dhanes* or *Maha Lat*.

The *Maha Lat* is a sociable, bold bird, found in all extensive groves and forests. It has several curious notes. They are generally found in pairs. Sometimes two or three pairs assemble on the same tree and begin to talk and quarrel, with a very singular sound of two syllables, thus—*Kakak* or *Kekekek* several times repeated in a guttural tone. It is not much unlike the sound of the peacock, but not so loud. When not quarreling it has another note more agreeable. Perhaps this is a note of love? This too is a compound sound, and is generally uttered when there is only one pair on a tree. One of the birds utters the note and the other responds with a low purring sound. To utter the full sound the bird lifts up its body from the tree, or shoots it forward, without rising from its legs. The *Maha Lat* takes very short flights from tree to tree, and does not often alight on the ground.

51. *CORACIAS INDICUS*, Linn. Native name, *Sulzuk* and *Nilkhant*.

"Though gifted with so brilliant a plumage, much cannot be said in praise of its shape. Its appearance on the wing is lovely, yet when perched we observe a large head, thick neck, prominent breast, and a pinched body, which is rendered more conspicuous by a long tail. It is a very common bird, is little afraid of man's approach, and is pugnacious, driving away the crow without much effort; it is a very noisy screaming bird, and in this respect is frequently very

troublesome. With the Hindoos it is esteemed sacred ; they consider it propitious if seen upon the day which concludes the Dassarah or Doorg-a-pooja festivals, and discharge their matchlocks to put it on the wing. The Birmahs commonly send parties to procure the feathers of this bird."—*C. W. Smith's Notes*.

This bird often shoots up perpendicularly into the air, screaming as it goes, and then with as sudden and nearly as steep a descent plunges towards the earth, but only to shoot up again. This it often continues for some minutes, till it settles on a bough.

When attacked by a hawk it shows great agility by twisting itself at the moment of the hawk's stoop, and when caught with its powerful beak it often seriously wounds the legs of its captor. The natives say that it sometimes breaks its legs. At any rate it has done this in the case of the Shikra (*Micronisus badius*).

I once observed this bird flying steadily forward, when presently an insect some yards beneath attracted its attention, after which it dived with a sudden twist, seized it, and pursued its course.

52. *BUCEROS GINGINIANUS*, Lath. Native name, *Lamdor* or *Dhanmar*.

Is very shy, especially towards roosting-time. A specimen killed at Hasanpur on the Ganges received two shots and died after repeated attempts to strangle it. It uttered a shrill sound like *kik* while on the tree and when wounded. In its belly was found a hard lump the size of a pigeon's egg, which on being cut open was found filled with the fruit of the Peepul and other trees.

53. *PALÆORNIS TORQUATUS*, Briss. Native name, *Gallar*.

Abounds in every part of India. They fly in great flocks to the fields and gardens, screaming as they fly. When perched on a tree, the Kite will sometimes swoop down on them and carry one off in its talons. The rest do not attempt a rescue, but fly in circles, screaming loudly. They destroy much more fruit than they eat, biting it off and letting it fall ; this is generally unripe fruit. The owl attacks these birds by night, and their feathers may sometimes be seen in the morning strewn the ground. They make their nest in holes of walls and trees.

On a journey in Rohileund I observed one fly out from a tree with a scream, and, taking a circuit in the air, sweep back to the tree, when, just seizing the tip of a branch far too slender to bear its weight, it swung round and round as if for amusement, and thus turned several summersaults, till by a spiral motion it ascended to the firm part of the branch.

54. *PALÆORNIS CYANOCEPHALUS*, Linn. Native name, *Tuia Totá*.

This Parrakeet is found feeding on the fruit of the Peepul tree.

55. *PALÆORNIS ALEXANDRI*. Native name, *Pahari Totá*.

56. *MEGALAIMA INDICA*, Lath. Native name, *Bassunta Lisora*.

Abounds in Rohileund, and is also a visitant in the neighbourhood of Muttra. They generally occur in pairs, and I have seen them in all high trees.

The voice of this bird is certainly very remarkable: it begins in a low tone, and gradually increases its pitch and its power until the whole tree seems vocal with one full rich sound. This ubiquity of sound much deceives a person endeavouring to see the bird which causes it, as he may look to any part of the tree, and his ear will never guide his eye. Another deception is the smallness and green colour of the bird, which hide it among the foliage; and the last is its immobility, for it remains fixed to one spot all the time it utters its note. When not thus engaged, it runs up and down the tree like a Woodpecker, displaying its beautiful yellow and green clothing.

57. *BRACHYPTERNUS AURANTIUS*, Linn. Native name, *Sat-Ranga*.

This Woodpecker is rather scarce here, but abundant in Bareilly. It breeds once a year, in Asarh, laying three or four eggs of a light-green colour in the hollows of trees.

58. *CENTROPUS RUFI-ENNIS*, Illiger. Native name, *Mahuka*.

I have shot this bird in Muttra. Its flesh is good eating. It is a very shy bird, and must be shot from an ambush. It moves by hopping and sometimes walking stately as a crow.

The *Mahuka* utters a cry in the morning so like that of an owl, that I was long deceived by it. The only difference is, that the *kook, kook, kook*, is pronounced a little more rapidly, and does not end in a run like that of the owl. The *kook* is uttered in a very guttural tone, and one bird answers the other—male and female. The cry is uttered on trees: it makes it with some effort, by swelling out its throat and bending its head.

On opening the stomach of a specimen shot, a lizard about the length of the hand was found. This lizard was beautifully marked with black bars, and is said to be intensely poisonous. My Bhustie, a very respectable trustworthy man, said that he once knew of a buffalo that died from the bite of this lizard, in its tongue.

59. *COCCYSTES MELANOLEUCOS*, Gmel. Native name, *Chātāk* or *Popiya*.

Visits the neighbourhood every hot season, and is now (May 22nd) in the garden. It has been observed to rise high in the air long before day, and utters its notes, which are very loud. I once shot a specimen as it was sitting one evening on the bare ground, pecking at some insects, while its mate sat on a low bushy tree close by. It is not at all shy, for though my man and family stopped before it, and though his gun flashed in the pan the first time, it did not fly away. I have been informed that they go out for the day into the jungle and return by evening.

Mr. C. J. Davis of Agra informs me that this bird lays its eggs in the nest of *Malacocercus*, and that it brings up the young bird.

This bird makes a great figure in Hindu poetry under the name of *Chātāk*.

60. *EUDYNAMYS ORIENTALIS*, Linn. Native name, *Koël*.

This is common in the neighbourhood. It is a very fickle bird, not staying many moments on any one tree. It jumps about all the time it is on the tree in search of food, apparently uttering various cries besides *Koël*. It begins with *kik, kik, kik*, then *koël, koël, koël*, and often talks low to itself *ku, ku, kã, kã*, like a crow, but in softer tones.

On June 4th, 1849, I observed a female *Koël* feeding her full-grown young one with pipul fruit. The young one was perfectly the same size as the mother, but its tail not so fully developed; its colour, however, was so unlike, that had I not seen it being fed by the *Koël*, and for a long time closely observed their exact similarity of shape, their similar mode of hopping from branch to branch, and the fact of the young following the female when she flew to another tree, I should have never believed it possible that they could be of the same species. The young was of a brownish colour, covered with dark brown bars all over, except the top of its head, which appeared dark brown or black; its breast was light-coloured, and the tail with broad white and brown bands.

From this fact it appears either that some *Koëls* rear their own young entirely, or that they watch till the crow turns them out of the nest, and then takes the charge of them. An intelligent native confirms the last supposition, and says that at Gwalior, in the large mango groves, the female *Koël*, from the time it has laid its egg, comes five or six times a day (although persecuted when seen by the crow), to see after the welfare of its young. This it continues till the crow drives out the fledged young one, when the mother flies off with it. This he has frequently seen.

61. *UPUPE EPOPS*, Linn. Native name, *Hūdhūd*.

The Hoopoe is common in India. I once saw a fight between a *Bhuj-ung* (*Dicrurus*) and a *Hūdhūd* (Hoopoe). This bird never feeds but on the ground, where it marches about with a bustling motion, and with its long beak hunts out all sorts of insects from holes in the ground. It is very fond of examining all the holes at the roots of large trees, where no doubt it often obtains a feast. It flies with such jerks that no hawk can catch it; even the swiftest and smallest hawks do not succeed. The Persians believe that this bird used to bring Solomon all the news of the country.

62. *NECTARINIA ASIATICA*, Linn. Native name, *Shakr Khora*.

This beautiful, purplish, steel-blue bird is common all over the north-west. In the winter it may be seen sporting on the sunny side of lofty trees. As soon as the Sahajna (*Hyperanthera Moringa*)

begins to blossom, it is constantly seen hovering before its white flowers, and as each forest tree begins to bloom, it rifles them of their sweets. It finds nourishment even in the Chamkra flower, and is now (May) every morning to be seen hovering over the poisonous Ak Madar Aling; with it many Humble-bees are seen feasting on the same sweets, and looking like smaller sun-birds. It is very bold, but does not like confinement, though it will suck out honey from flowers put between the bars of its cage. It sings pleasantly, *i. e.* it has two or three sharp pretty chirps. It moults in the rainy season, and at this time its whole breast is yellow, with the exception of a purple line in the middle; the back feathers are all a dull olive-green, but with one or two purple feathers appearing.

This bird often alights on the twig near the flower if smooth, and twisting its head over it, sucks out the honey.

4. DESCRIPTIONS OF SOME NEW SPECIES OF LEPIDOPTEROUS INSECTS FROM NORTHERN INDIA. BY FREDERIC MOORE, ASSISTANT MUSEUM EAST INDIA COMPANY.

(Annulosa, Pl. XLIV.-XLV.)

1. *PIERIS NAMA*, E. Doubleday, MS. (Pl. XLIV. figs. 1, 2.)

Male.—Upper-side white; fore-wing with a narrow brown line along costal margin, curving and widening across near the middle of the wing, and again tapering to posterior angle; hind-wing tinged with black (as if from intensity of that colour on the under-side) along the outer margin, where the veinlets are dark brown.

Female.—Brown, with three longitudinal white streaks in middle of fore-wing, and two in the hind-wing: these streaks in some specimens being confluent and occupying nearly the whole of the middle of both fore- and hind-wings; under-side, along costal margin and widening to the outer margin of fore-wing, greenish-yellow, the rest white; hind-wing greenish-yellow, darker on the veins, and nearly white along discoidal cell towards anterior angle.

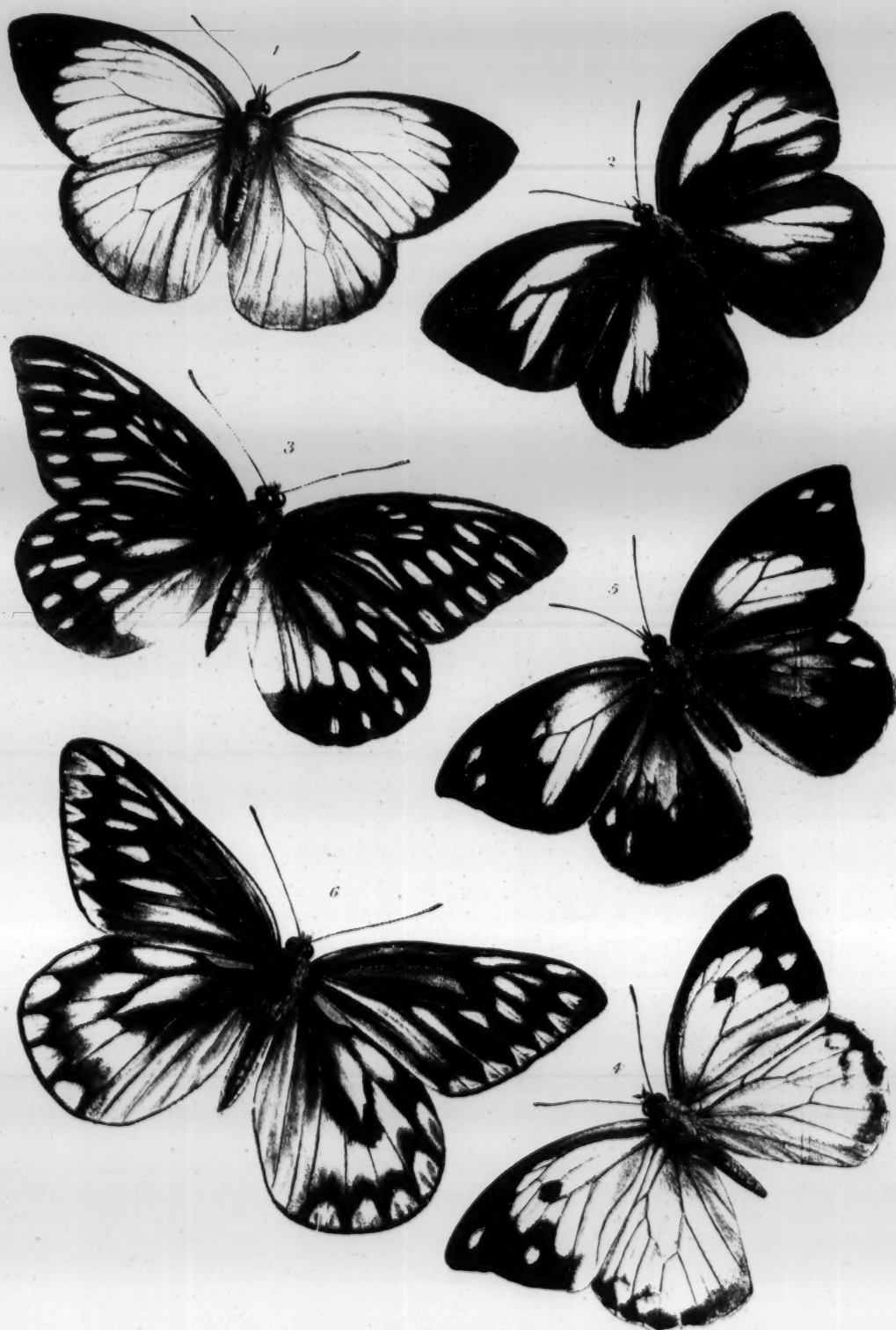
Expanse of wings $2\frac{1}{2}$ to 3 inches.

Hab. Darjeeling; Sylhet; Pootan. In Mus. East India Company.

Remark.—The late Mr. E. Doubleday was acquainted with the male insect only, to which he applied the above MS. name to specimens in the British Museum; both sexes I have now the pleasure of characterizing.

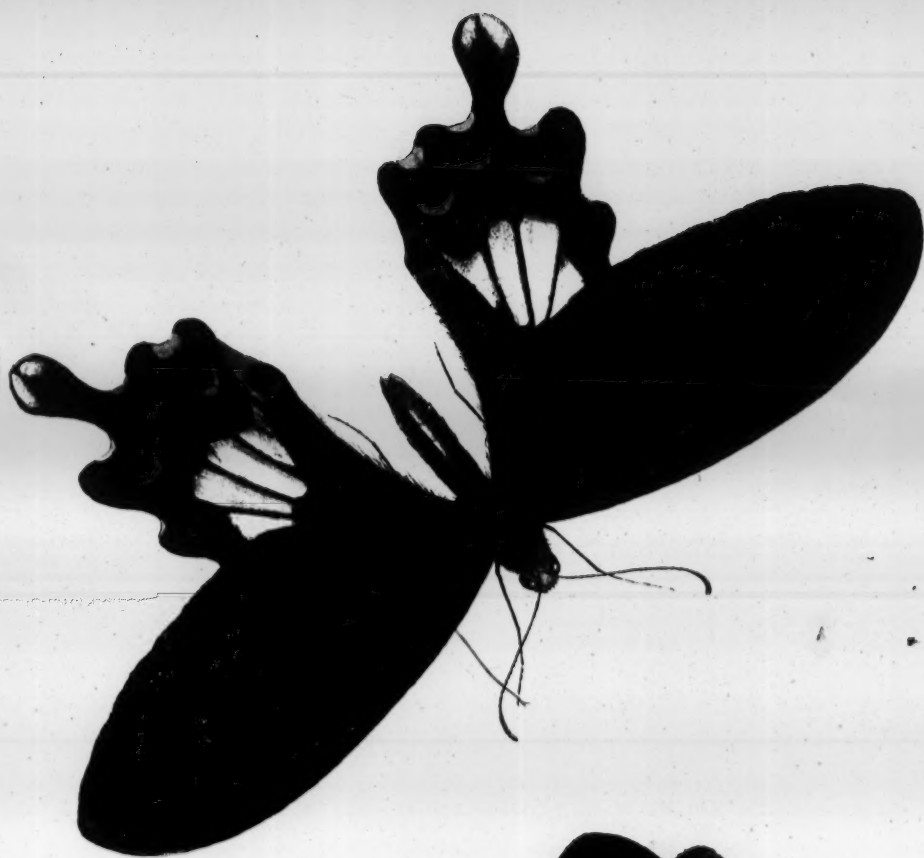
2. *PIERIS SETA*, Moore. (Pl. XLIV. fig. 3.)

Upper-side blackish-brown; fore-wing with two rows of narrowish white marks, two lengthened marks between median and submedian veinlets, and four small spots within discoidal cell; hind-wing with a marginal row of whitish spots, another row from costal margin widening towards the anal angle, abdominal margin broadly whitish,



1 2. *Pieris Nani* 3. *Pieris Seta* Moore 4. *Pieris Sanaca* Moore
5. *Pieris Indra* Moore 6. *Pieris Durvasa* ? Moore

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Papilio Junaka Moore

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the latter tinged with yellow, also a white linear mark in discoidal cell. Under-side as in the upper-side, but with all the markings on the hind-wings yellow. Wings shaped as in *P. Thestylis*. Expanse of wings $3\frac{7}{8}$ inches.

Hab. Bootan. In Mus. East India Company.

3. *PIERIS SANACA*, Moore. (Pl. XLIV. fig. 4.)

Upper-side white; fore-wing with the veins and veinlets broadly clouded with black, leaving only a row of lanceolate white spots on the outer margin, and another row of more linear-shaped marks extending across the disc; hind-wing with the veins and veinlets sharply defined with black, discoidal and median veins clouded with black, the latter broadly so; also a marginal row of angular lunate marks; anterior base and anal angle bright yellow. Under-side: fore-wing as in the upper-side, but the white markings more clearly defined, those near the anterior angle being yellowish; hind-wing with the dark colour broader, and the white spaces nearly covered with yellow. Shape of wings as in *P. Belladonna*. Expanse of wings $3\frac{1}{4}$ inches.

Hab. Darjeeling. In Mus. East India Company.

4. *PIERIS INDRA*, Moore. (Pl. XLIV. fig. 5.)

Upper-side dark brown; fore-wing with a central longitudinal space of white from the base, also two small white spots near anterior angle; hind-wing with the anterior base brownish greenish-white, also with two white spots near anterior angle. Under-side: fore-wing with a broad irregular fascia from middle of costal margin to posterior angle; anterior angle chrome-yellow, with some white dividing the two colours; basal half white, tinged with straw-yellow along discoidal cell; hind-wing chrome-yellow, and minutely irrorated with brown; anterior half of discoidal cell and space between each veinlet near outer margin white, also a dark brown dot on discocellular veinlet. Wings shaped as in *P. Paulina*. Expanse of wings 3 inches.

Hab. Darjeeling. In Mus. East India Company.

The nearest ally of *P. Indra* appears to be *P. Lalage*, E. Doubleday, Diurnal Lep. t. 6. f. 5, also from N. India.

5. *PIERIS DURVASA*, Moore. (Pl. XLIV. fig. 6.)

Male.—Upper-side white; fore-wing from middle of costal margin, curving transversely, apically, and scalloped to near end of outer margin, black, and having near the apex some white marks, generally three, the outer ones being sometimes indistinct; base of costal margin and body greenish; on the middle of disco-cellular veinlets is a round black spot, and another more quadrate spot between the first and second median veinlets, the latter slightly touching at the angle the scalloped black outer margin.

Female.—Black colour broader, the quadrate spot larger and broadly confluent at the angle with the outer margin, thus forming a white spot on middle of outer margin; hind-wings of female with a marginal row of blackish spots, the extreme margin and anal angle

being yellowish-white. Under-side : apex of fore-wing pale yellow, the black colour forming only a curved transverse bar, besides the two black spots ; hind-wings wholly pale yellow, and having a small disco-cellular black spot ; body yellowish.

Expanse of wings $2\frac{1}{4}$ to $3\frac{3}{8}$ inches.

Hab. Darjeeling, Assam. In Mus. East India Company.

The form of the wings of *Pieris Durvasa* is the same as in *P. Paulina* and *P. Pandione*.

6. PAPILIO JANAKA, Moore, n. sp. (Pl. XLV.)

Upper-side black ; hind-wing with a white patch on the disc, which is divided by three of the veinlets, thus forming four separate patches, the outer one on each side being the shortest, and the two nearest the abdominal margin being tinged with red ; three submarginal and three marginal lunules and circular mark at anal angle red ; tail with two red spots. Under-side black ; fore-wing with the base red ; hind-wing with patch on the disc as on upper-side, but the portion nearest abdominal margin nearly covered with red, which colour is continued upwards and downwards, occupying the base of the wing and the whole space between the third median veinlet and submedian vein ; lunules as above, but are larger, and a fourth submarginal one appears between the discoidal and first median veinlets ; tail spotted as above ; cilia between the angles white ; head, neck, body beneath and sides red.

Wings shaped as in *P. Bootes*, Westw. Arc. Ent. t. 31.

Expanse of wings 5 inches.

Hab. Darjeeling. In Mus. East India Company.

Remark.—*Papilio Bootes* appears to be a near ally of *P. Janaka*.

May 26, 1857.

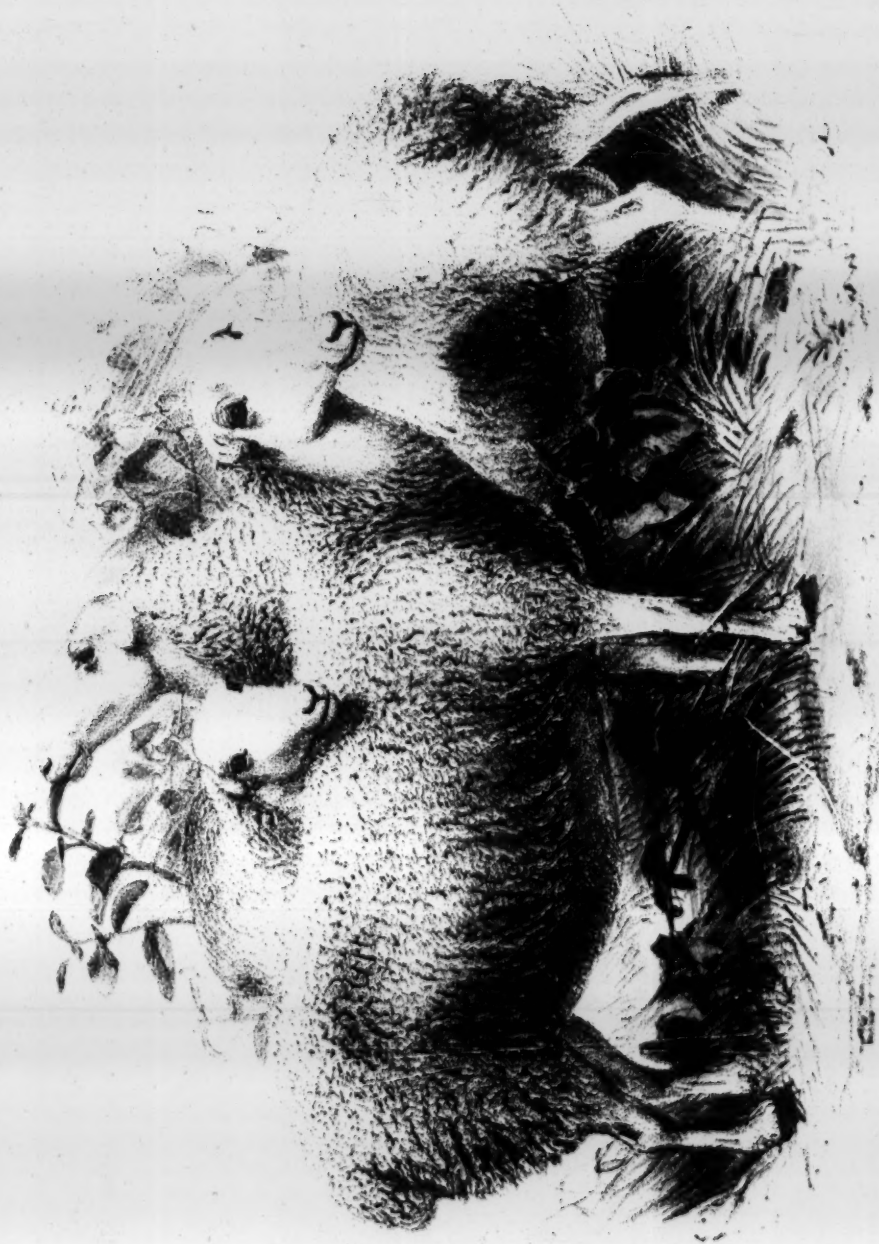
Dr. Gray, F.R.S., V.P., in the Chair.

The following papers were read :—

1. DESCRIPTION OF CHINESE SHEEP SENT TO H. R. H. PRINCE ALBERT BY RUTHERFORD ALCOCK, Esq., H.M. VICE-CONSUL AT SHANGHAI. PRESENTED BY H. R. H. TO THE ZOOLOGICAL SOCIETY IN APRIL 1855. BY A. D. BARTLETT, Esq.

(Mammalia, Pl. LII.)

These Sheep differ from all others that I have seen in not possessing external ears. In size they are equal to ordinary sheep ; the wool is perfectly white, rather coarse and mixed with long hairs ;



W. J. Wolf, del.

H. E. Henshaw, sculp.

SHANGHAI SHEEP

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the head and face are smooth, and covered with white hair; they have no horns; the tail is short, rather broad, and turned up at the tip; the profile is very convex.

My attention was first called to these sheep from the fact of their great reproductive power. I find they breed twice in a year, and produce four and sometimes five at a birth, the three ewes now in the Society's Gardens having this spring produced *thirteen lambs*. These lambs are very easily reared by hand, and are perfectly hardy. Upon referring to Miss Corner's 'History of China,' published in 1847, it appears that since the introduction of the cotton plant into China (which took place during the Ming dynasty, about 500 years ago), the breeding and rearing of sheep have been neglected, as the following extract will show:—

"The extended cultivation of cotton was one of the causes that led to the almost entire disappearance of sheep from the southern provinces, for it was found that it would take much more land to supply a certain number of persons with mutton and wool, than with rice and cotton. Then the pastures were gradually turned into rice and cotton plantations, while sheep were banished to the mountains and less fertile parts of the country. For the same reason cattle, horses, and other domestic animals are scarce; the few that are kept for the purposes of husbandry are poor and ill-fed; for there is not a common one on which they can graze, so that they are tied up in stalls when not employed in the field. Dairy farms are unknown in China, where people use neither milk, butter, nor cheese."

In a recent letter from China, the writer mentions, among other matters, that in giving a good dinner to some distinguished friends, one of the choicest dishes was a leg of mutton, the cost of which was equal to 30s.

Having submitted specimens of the wool of this animal to my friend Dr. Price, who kindly forwarded the same to Mr. Darlington, the Secretary to the Chamber of Commerce at Bradford, for the purpose of having it examined by the most competent judges, the following report from these gentlemen was received. They say, "That the sample of sheep's wool from China enclosed in Dr. Price's letter, is a class of wool which would be extensively used by the manufacturers of this district for goods of low quality; that it appears to be wool suitable for combing purposes, and would now command about one shilling per pound."

That the wool does not appear to offer any great inducement for its introduction will be seen by the above report. I, however, think it highly probable by cultivation and judicious crossing, a great improvement may be fairly looked for. It is, however, to us a matter of the utmost importance that we should possess animals whose power of reproducing is greatest, in order to supply the increased demand for meat.

The origin of our domestic animals has been a subject of much discussion; the remote period of their domestication involves us in much doubt; and this mystery and obscurity will probably never be satisfactorily cleared up. It is, however, interesting to find in a

country whose civilization is of such ancient date as China, the most perfect of domestic animals: I mean by this, the animals that are furthest removed from their natural condition.

Now, knowing what wonderful changes can be, and are produced in the vegetable kingdom by skilful modes of propagating, cultivating and artificially treating plants, causing them completely to change their nature, producing all kinds of variety of monstrous growth, double flowers, fruit and seed in enormous abundance;—all this being done by the interference of man, may I ask, is it not probable that a people like the Chinese, whom we know to have practised these arts for ages,—is it not likely that they have by artificial means induced a similar power in these domestic animals; as we find, for example, the pigs, the fowls, the geese and the sheep of China more prolific than the same animals in any other part of the world? Instances of Chinese sows producing twenty-two at a litter have come within my own observation; their fowls are certainly unequalled for the number of their eggs, and their geese as reproducers stand unrivalled.

It is almost needless to say that the result of cultivation, whether as applied to plants or animals, has produced an unnatural and abnormal condition: instances too numerous to mention may be found, but it will be sufficient to notice the pigeons and ducks. The former in a wild state produce only two broods in a season; while in a state of domestication they continue to breed all the year. The domestic ducks not only produce a much larger number of eggs, but one drake is sufficient for a number of ducks, five or six; while in a state of nature they universally are found in pairs.

Experience has proved that by a careful admixture or crossing in the breed of the Chinese pigs, geese, and fowls, the mixed races are much improved in quality and size, while they retain the reproductive power undiminished, and the animals are more hardy. As regards poultry, I cannot admire the celebrated Cochin China breed in their pure state, but I have abundant proof of their great value for breeding and crossing; the least possible trace of the breed appears sufficient to impart all that is desirable, and by after-breeding, the improvement that may be made is as astonishing as it is undeniable. As crossing the breed in the animals before mentioned has been attended with so much success, there is no reason why crossing the Sheep should not also produce a favourable result.

It must not be supposed, because the Chinese have banished their Sheep (having found cotton and rice more suited to their climate and better adapted to their wants), that they are unworthy of our notice, taking into consideration that in this country we cannot grow cotton or rice.

Having witnessed the many attempts that have been made to reduce some of the existing wild animals to a state of domestication, and observing the utter failure in all instances of producing what may fairly be called a domestic variety of any true species, I am inclined to believe it is necessary as a means of reducing wild animals to a domestic condition, that they must be crossed with nearly allied

species; by this means the creatures are rendered unnatural, and consequently dependent on man. Different varieties would doubtless be produced, according to the manner in which they were crossed, and permanent varieties would be thus established. Such is the opinion, at which I have arrived, after a long and mature consideration of this extremely interesting subject.

2. DESCRIPTIONS OF THIRTY-ONE NEW SPECIES OF LAND-SHELLS, FROM MR. CUMING'S COLLECTION.
BY DR. L. PFEIFFER.

1. *HELIX SUBDECUSSATA*, Pfr. *Testa perforata, turbinata, tenuis, irregulariter plicato-striata, superne striis spiralibus obsolete decussata, pellucida, virenti-hyalina; spira conica, apice obtusula; anfr. 6 convexiusculi, ultimus non descendens, peripheria subcarinatus, basi convexior, nitidus; apertura obliqua, late lunaris; perist. simplex, rectum, marginibus remotis, columellari superne vix reflexiusculo.*

Diam. maj. 14, min. 12, alt. 9 mill.

Hab. Bombay.

2. *HELIX GRANUM*, Pfr. *T. perforata, turbinato-globosa, tenuis, confertissime costulato-striata, pallide cornea, rufulo irregulariter variegata; spira conoidea, acutiuscula; anfr. 5½ convexi, ultimus non descendens, prope suturam turgidulus; apertura vix obliqua, late lunaris; perist. simplex, rectum, marginibus subconvergentibus, columellari vix patulo.*

Diam. maj. 4, min. 3½, alt. 3 mill.

Hab. New Zealand.

3. *HELIX FATUA*, Pfr. *T. perforata, turbinata, tenuiuscula, irregulariter striata, vix nitidula, fulva; spira conoidea, acutiuscula; anfr. 5-5½ modice convexi, ultimus non descendens, peripheria subcarinatus, basi convexiusculus; apertura parum obliqua, lunaris; perist. simplex, rectum, margine columellari substricto declivi.*

Diam. maj. 5, min. 4½, alt. 2½ mill.

Hab. New Zealand.

4. *HELIX BIRMANA*, Pfr. *T. perforata, depressa, suborbicularis, tenuiuscula, lævigata, subdiaphana, alba, fascia 1 lutea supra medium ornata; spira brevissime conoidea, vertice sensim prominulo; sutura levis, marginata; anfr. fere 7 modice convexi, lente accrescentes, ultimus rotundatus, non descendens; apertura vix obliqua, late lunaris; perist. rectum, intus subincrassatum, margine dextro brevi, basali fere rectilineari, superne vix dilatato.*

Diam. maj. 26, min. 23½, alt. 12½ mill.

Hab. Mergui, Burmah.

5. **HELIX DECIDUA**, Pfr. *T. umbilicata, depresso-turbinata, tenuis, costulis membranaceis, deciduis sculpta, corneo-lutescens, rufulo obsolete et angulatim strigata; spira subregulariter conoidea; anfr. 5 convexiusculi, lente accrescentes, ultimus non descendens, periphæria subangulatus; umbilicus angustus, pervius; apertura obliqua, lunato-rotundata; perist. simplex, rectum, marginibus convergentibus, columellari vix patulo.*

Diam. maj. $3\frac{1}{4}$, min. $3\frac{1}{4}$, alt. 2 mill.

Hab. New Zealand.

6. **HELIX VENULATA**, Pfr. *T. imperforata, depressa, tenuis, confertim plicato-striata, sericina, corneo et rufulo strigatim et maculatim variegata; spira vix elevata; anfr. $4\frac{1}{2}$ convexi, sensim accrescentes, ultimus non descendens, basi medio impressus; apertura verticalis, elongato-lunaris; perist. simplex, margine dextro recto, basali reflexiusculo, columellari declivi, subcalloso, adnato.*

Diam. maj. 6, min. 5, alt. 3 mill.

Hab. New Zealand.

7. **HELIX SCIADIUM**, Pfr. *T. umbilicata, conoideo-semiglobosa, solidula, subarcuato-striata, fulva, rufulo obsolete variegata; spira convexo-conoidea, apice acutiuscula; sutura marginata; anfr. $5\frac{1}{2}$ vix convexiusculi, ultimus non descendens, periphæria acute carinatus, basi paulo convexior; umbilicus $\frac{1}{4}$ diametri fere æquans; apertura vix obliqua, angulato-lunaris; perist. simplex, rectum, margine columellari vix patulo.*

Diam. maj. $5\frac{1}{3}$, min. 5, alt. 3 mill.

Hab. New Zealand.

8. **HELIX NIPHAS**, Pfr. *T. imperforata, globoso-conica, solida, plicato-striata, alba; spira convexo-conica, apice obtusa; anfr. $5\frac{1}{2}$ convexiusculi, lente accrescentes, ultimus non descendens, basi parum convexus; apertura obliqua, lunaris; perist. rectum, marginibus remotis, dextro brevi, simplice, basali versus insertionem sensim incrassato, tandem breviter ascendente.*

Diam. maj. 11, min. 10, alt. 8 mill.

Hab. S. Miguel, Azores.

9. **HELIX LUTACEA**, Pfr. *T. umbilicata, conoideo-depressa, solida, striatula et striis confertissimis spiralibus decussatula, parum nitens, fusco-lutescens; spira conoidea, obtusula; anfr. $4\frac{1}{2}$ convexiusculi, sensim accrescentes, ultimus subdepresso-rotundatus, obsolete angulatus, antice vix descendens; umbilicus angustus, pervius; apertura diagonalis, rotundato-lunaris; perist. crasse albo-labiatum, marginibus subconniventibus, dextro expanso, basali reflexo, juxta umbilicum dilatato.*

Diam. maj. 23, min. fere 20, alt. 12 mill.

Hab. —?

10. **HELIX EXARATA**, Pfr. *T. umbilicata, conoideo-depressa,*

solidula, undique malleato-rugulosa, lutescens, fascia 1 castanea cincta; spira breviter conoidea, acutiuscula; anfr. 7 parum convexi, lente accrescentes, ultimus latior, rotundatus, antice vix descendens, circa umbilicum mediocrem, apertum subcompressus; apertura obliqua, late lunaris; perist. leviter albo-labiatum, marginibus vix convergentibus, dextro breviter expanso, columellari superne triangulatim dilatato, patente.

Diam. maj. 30, min. 25, alt. 16 mill.

Hab. California?

11. *HELIX MORMONUM*, Pfr. *T. umbilicata, depressa, tenuiuscula, arcuato-striatula, pallide rufescens; spira vix conoideo-elevata; anfr. 6 vix convexiusculi, lente accrescentes, ultimus utrinque convexior, antice turgidulus, vix descendens, supra medium fascia castanea, utrinque albido-marginata cinctus, basi convexus; umbilicus mediocris, conicus; apertura perobliqua, auriformi-lunaris; perist. albo-labiatum, marginibus convergentibus, dextro perarcuato, expanso, columellari arcuato-declivi, reflexo, superne dilatato.*

Diam. maj. 29, min. $24\frac{1}{2}$, alt. $12\frac{1}{2}$ mill.

Hab. Mormon Island, California.

12. *HELIX PROPINQUA*, Pfr. *T. umbilicata, globoso-depressa, tenuis, striatula, albida vel pallide fuscula, fascia 1 angusta supra medium ornata; spira brevissime conoidea; anfr. 4-5 convexiusculi, ultimus rotundatus, antice deflexus; umbilicus angustus, pervius; apertura diagonalis, lunato-subcircularis; perist. album, sublabiatum, marginibus convergentibus, undique late expansis.*

Diam. maj. 16-19, min. 13- $15\frac{1}{2}$, alt. $7\frac{1}{2}$ - $9\frac{2}{3}$ mill.

Hab. Bombay.

13. *HELIX BICRURIS*, Pfr. *T. umbilicata, depressa, tenuis, striatula, parum nitida, corneo-lutescens; spira parum elevata; sutura submarginata; anfr. 5 convexiusculi, ultimus antice vix deflexus, basi convexior, pone aperturam subconstrictus; umbilicus vix pervius, antice rimæformis; apertura diagonalis, lunaris, dente libero longe bicruri parietis coarctata; perist. breviter reflexum, album, margine basali bidentato: dente dextro usque ad marginem superum ascendente.*

Diam. maj. 9, min. 8, alt. $4\frac{1}{2}$ mill.

Hab. Mexico.

14. *BULIMUS FAIRBANKI*, Pfr. *T. anguste et compresse umbilicata, ovato-conica, tenuiuscula, conferte striata et costis irregulariter distantibus, compressis, subarcuatis sculpta, sub lente exilissime spiraliter striata, haud nitens, fulvescenti-albida; spira conica, apice obtusa; anfr. 6 convexi, ultimus spira vix brevior, juxta umbilicum compressus; apertura parum obliqua,*

elliptico-ovalis; perist. album, marginibus conniventibus, dextro mediocriter expanso, columellari stricto, late patente.

Long. 19, diam. $9\frac{1}{2}$ mill.

Hab. Ahmednugger, India (Fairbank).

15. *PARTULA MASTERSI*, Pfr. *T. dextrorsa, anguste umbilicata, ovato-conica, solidula, spiraliter subconferte sub lente striata, lutea, carnea vel violacea, in anfractibus superioribus interdum fusco-fasciata; spira conica, acutiuscula; anfr. 5 convexiusculi, ultimus spiram subæquans, deorsum turgidus; columella superne subinflata, recedens; apertura obliqua, truncato-oblonga; perist. callosum, undique subæqualiter expansum, subplanum, album vel fusco-carneum.*

Long. 18, diam. $9\frac{2}{3}$ mill.

β. *Carnea, anfr. ultimo pone peristoma striga lata violacea notata, dente parvulo albo profundo in ventre anfr. penultimi.*

Hab. Isle of Guam.

16. *SUCCINEA GUAMENSIS*, Pfr. *T. conico-ovata, tenuis, ruguloso-plicata et subgranulata, semipellucida, pallide cornea, albo irregulariter eroso-punctulata; spira brevis, vertice subpunctiformi; anfr. vix $2\frac{1}{2}$, penultimus convexus, ultimus $\frac{3}{4}$ longitudinis subæquans, basi vix angustatus; apertura obliqua, ubique incumbens, angulato-ovalis; perist. simplex, marginibus callo tenui junctis, columellari leviter arcuato, filari.*

Long. 12, diam. 7, alt. $5\frac{1}{2}$ mill. (*Helix putris*, Fér. Hist. t. 10 A. f. 10.)

Hab. Isle of Guam.

17. *SUCCINEA CHINENSIS*, Pfr. *T. ovato-conica, solidula, leviter plicata, semipellucida, rubello-cornea; spira mediocris, vertice subtili; anfr. vix 3, penultimus convexus, ultimus $\frac{5}{8}$ longitudinis fere æquans, medio ventrosus; apertura obliqua, superne non incumbens, angulato-ovalis, intus submargaritacea; perist. simplex, marginibus callo tenuissimo junctis, columellari angulum obsoletum formante.*

Long. $8\frac{3}{4}$, diam. $5\frac{1}{3}$, alt. 4 mill.

Hab. Hong Kong, China (Mr. Browning).

18. *SUCCINEA BERMUDENSIS*, Pfr. *T. oblongo-conica, gracilis, striatula et impresso-punctata, parum nitida, carneo-albida, sparse pellucide strigata; spira conica, acuta; anfr. $3\frac{1}{2}$ convexiusculi, ultimus $\frac{2}{3}$ longitudinis subæquans; apertura obliqua, subregulariter acuminato-ovalis, ubique incumbens; columella leviter arcuata, superne subcallosa; perist. simplex, rectum, margine dextro superne obsolete sinuato.*

Long. $10\frac{1}{2}$, diam. $5\frac{1}{2}$, alt. $4\frac{1}{3}$ mill.

Hab. Isle of Bermuda.

19. *CYLINDRELLA MACROSTOMA*, Pfr. *T. profunde rimata, fusiformi-oblonga, truncata, solida, conferte striata, alabastrina; spira ventrosa, sursum attenuata, late truncata; anfr. superst. 7 vix convexiusculi, ultimus antice ascendens, basi distincte carinatus; apertura subverticalis, oblonga, plica medio-cri columellæ coarctata; perist. album, late expansum, marginibus convergentibus, callo junctis.*

Long. 19, diam. 7 mill.

Hab. Isle of Jamaica.

20. *TRUNCATELLA CALIFORNICA*, Pfr. *T. non rimata, turritocylindracea, truncata, tenuiuscula, leviter striata, parum nitens, pallide rubello-cornea; spira sursum vix attenuata; sutura simpliciter marginata; anfr. superst. 4 convexi, sensim accrescentes, ultimus basi non compressus; apertura verticalis, ovalis, superne vix angulata; perist. simplex, continuum, margine dextro expanso, superne subrependo, columellari adnato.*

Long. $4\frac{2}{3}$, diam. $1\frac{1}{3}$ mill.

Hab. San Diego, California.

21. *LUCIDELLA NANA*, Pfr. *T. conoidea, solidula, carinata, concentricè lirata, opaca, albida; spira conoideo-semiglobosa; anfr. fere 5 convexiusculi, ultimus basi lævior, medio impressus; apertura perobliqua, subtriangularis; perist. subincrassatum, margine supero leviter, basali prope insertionem valide dentato.*

Diam. maj. 3, min. $2\frac{3}{4}$, alt. vix 2 mill.

Hab. Isle of Jamaica.

22. *HELICINA SPRUCEI*, Pfr. *T. globoso-turbinata, tenuis, lævigata, diaphana, carnea vel pallide lutescens, albido interdum interrupte fasciata; spira convexiusculo-conoidea, acuta; anfr. 5 convexiusculi, ultimus rotundatus, spiram æquans; columella breviter recedens, subincrassata, basi subdentata, callum emit-tens tenuem, albidum; apertura obliqua, semiovalis; perist. breviter expansum, margine basali flexuoso, sinu levi a columella separato.*

Diam. maj. 9, min. 8, alt. $6\frac{1}{2}$ mill.

Hab. Tarapoto, Andes of Peru (Spruce).

23. *HELICINA MERGUIENSIS*, Pfr. *T. depresso-turbinata, tenuiuscula, oblique striata et spiraliter confertissime sulcata, nitidula, carnea; spira conoidea, apice lutea, acutiuscula; anfr. $4\frac{1}{2}$ planulati, ultimus compresse et acute carinatus, basi modice convexus, callo centrali nitido, granulato munitus; columella brevissima, basi obsolete tuberculata; apertura diagonalis, triangularis; perist. album, breviter expansum, margine basali cum columella subangulatim juncto.—Operc. margarita-ceum.*

Diam. maj. $7\frac{1}{2}$, min. $6\frac{2}{3}$, alt. 4 mill.

Hab. Mergui, British Burmah.

24. CYCLOSTOMA (LEPTOPOMA) WALLACEI, Pfr. *T. perforata, globoso-turbinata, tenuis, oblique striata et carinis 5-6 sub-acutis, lirisque minoribus spiralibus munita, diaphana, albida, fasciis fuscis varie signata; spira elato-turbinata, acutiuscula; anfr. 5 perturgidi, subangulati, ultimus basi albidus; apertura obliqua, subcircularis; perist. simplex, album, breviter interruptum, margine dextro æqualiter patente, sinistro superne sinuato, tum subangulatim producto.—Operc. pallide corneum.*

Diam. maj. 11, min. 9, alt. 9 mill.

Hab. Borneo (Wallace).

25. CYCLOSTOMA (CYCLOPHORUS?) ÆQUIVOCUM, Pfr. *T. impervie umbilicata, globoso-turbinata, solida, sublævigata (detrita) rubella, castaneo obsolete trifasciata; spira turbinata, acutiuscula; anfr. 5½ convexi, ultimus turgidus, infra medium obsolete angulatus; apertura verticalis, circularis; perist. duplex: internum porrectum, igneo-fuscum, externum latiuscule et horizontaliter patens, ad anfr. contiguum excisum.*

Diam. maj. 28, min. 20, alt. 20 mill.

Hab. Madagascar.

26. CYCLOSTOMA (CYCLOPHORUS?) LIGNARIUM, Pfr. *T. anguste umbilicata, turbinata, tenuiuscula, oblique irregulariter striata, sub epidermide opaca lignaria rufa; spira conica, convexiuscula; anfr. 5½ convexi, ultimus basi subplanatus; apertura diagonalis, ovali-rotundata; perist. duplex: internum album, adnatum, subcontinuum, externum, membranaceum, anguste expansum, ad anfr. contiguum excisum.*

Diam. maj. 5, min. 4½, alt. 4 mill.

Hab. New Zealand.

27. HYDROCENA CHINENSIS, Pfr. *T. perforata, ovato-turrita, vix striatula, nitida, livido-fusca; spira elongato-conica, acutiuscula; anfr. 7 convexiusculi, ultimus ⅓ longitudinis paulo superans, infra peripheriam angulatus, basi subplanatus; apertura parum obliqua, tetragono-ovalis; perist. simplex, rectum, margine columellari subdilatato, patente.—Operc. membrana-ceum, pallidum.*

Long. 15, diam. 8 mill.

Hab. China.

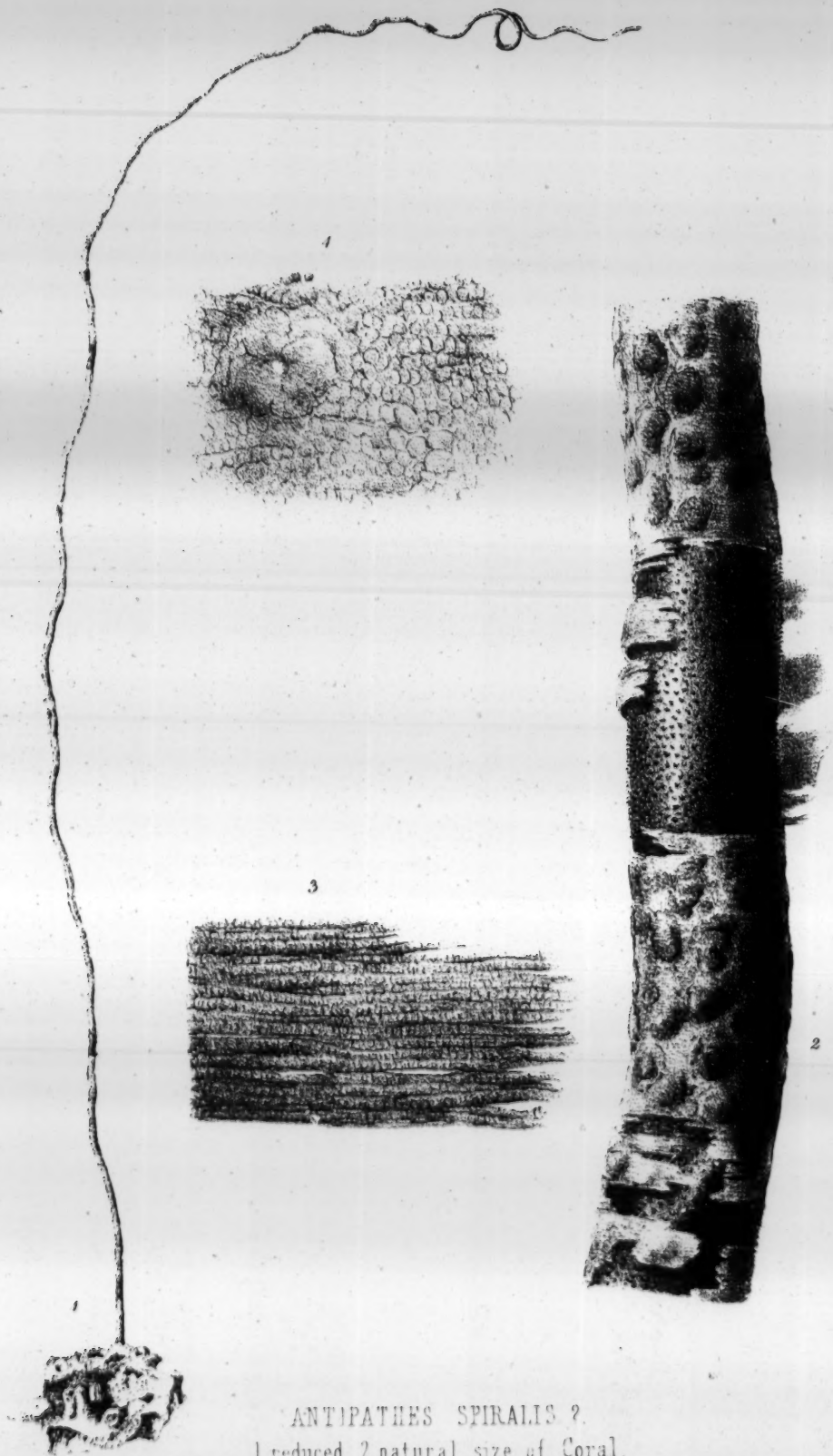
28. HYDROCENA VULPINA, Pfr. *T. perforata, globoso-conica, solida, lævigata, rubella; spira conica, acutiuscula; anfr. 5 modice convexi, ultimus spiram æquans, rotundatus; apertura parum obliqua, angulato-ovalis; perist. subcontinuum, adnatum, margine dextro subinflexo, columellari calloso.—Operc. tenue, castaneum, paucispirum.*

Long. 8, diam. 6 mill.

Hab. Fox Islands.

29. HYDROCENA (OMPHALOTROPIS) CEREAE, Pfr. *T. vix per-*

5 00 58



ANTIPATHES SPIRALIS ?
1 reduced. 2 natural size of Coral.
3 inside 4 outside of bark magnified

forata, ovato-conica, solidula, lævigata, vix nitidula, cerea; spira convexo-conica, acuta; anfr. $5\frac{1}{2}$ vix convexiusculi, ultimus $\frac{1}{3}$ longitudinis paulo superans, rotundatus, perforationem punctiformem carina callosa obtusa cingens; apertura parum obliqua, angulato-ovalis; perist. simplex, rectum, margine columellari brevissime fornicato-patente.

Long. $4\frac{1}{2}$, diam. $2\frac{2}{3}$ mill.

Hab. Norfolk Islands.

30. HYDROCENA (OMPHALOTROPIS) GUAMENSIS, Pfr. *T. perforata, ovato-conica, solidula, conferte striata, opaca, carnea, rufo submarmorata et fasciata; spira conica, acuta; sutura subcanaliculata; anfr. $5\frac{1}{2}$ planiusculi, ultimus spira vix brevior, infra medium carinatus, circa perforationem carina compressa munitus; apertura parum obliqua, ovalis; perist. tenue, margine dextro expansiusculo, basali in carinam umbilicalem producto, columellari vix dilatato.*

Long. $6\frac{1}{2}$, diam. 4 mill.

Hab. Isle of Guam.

31. HYDROCENA (OMPHALOTROPIS) NAVIGATORUM, Pfr. *T. anguste perforata, ovato-turrita, solidula, fusca, costis subdi-stantibus, albis, undulatis munita; spira elongato-conica, acutiuscula; anfr. 6 convexi, prope suturam filocarinati, ultimus $\frac{2}{3}$ longitudinis subæquans, supra carinam impressus, circa perforationem carina compressa munitus; apertura vix obliqua, subelliptica; perist. simplex, rectum, margine columellari vix patulo.*

Long. $6\frac{1}{3}$, diam. $3\frac{2}{3}$ mill.

Hab. Navigators' Islands.

3. ON THE ANIMAL AND BARK OF THE GENUS ANTIPATHES. BY DR. J. E. GRAY, F.R.S., F.L.S., V.P.Z. AND ENT. SOC. ETC.

(Radiata, Pl. VI.)

In the 'Proceedings' of the Society for 1832, p. 41, I described for the first time the bark and animal of *Antipathes dichotoma* from Madeira.

It is to be observed that this species has been separated from the others of the genus because the surface of the axis is smooth and not covered with a number of minute, uniform, cylindrical spines like the true *Antipathes*, and has been called for that reason *Leio- pathes*; and it has been further stated, that though *Leio- pathes* has a distinct bark and animal like *Gorgoniadæ*, this may not be the case with the normal species of the genus, some of which had been described by Ellis as having a very peculiar kind of animal.

To set this question at rest, I have carefully examined all the specimens of *Antipathes* which have come under my observation, and

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have failed to discover any traces of a bark or remains of any kind of animal matter on their surface, until a few days ago, when Mr. Samuel Stevens brought to the Museum a very fine specimen of a long simple-stemmed *Antipathes* from Seychelles, which appears to be a new species, allied to *A. spiralis*, if more than a very fine straight specimen of that species.

This specimen is entirely covered from near the expanded base to the apex (except at certain parts where the surface has been accidentally abraded) with a very distinct bark or animal covering.

The bark is continuous, completely hiding the spinules of the surface of the axis, smooth, and showing a number of thicker, browner, irregular-shaped plates on the surface, which are separated from each other in some places only by narrow crack-like grooves, and at others by a considerable distance; and there is no appearance, in the dry state, as far as I can detect, of any apertures for the emission of the heads of the polypes.

The bark in its dry state is then tough and rather rigid; when soaked in water, it becomes thick, coriaceous externally, and fleshy within; when soaked in a solution of potash, the harder plates appeared to be formed of a rather convex horny plate of irregular shape and rather twisted on the surface, and the other part of the bark is scattered with groups of very small, uniform-sized, regular-shaped, oblong plates, of a somewhat similar consistence and colour.

The hard parts of the bark are quite distinct in form and appearance from the spiculæ of the *Gorgoniadæ*. They are hard and brittle, not soluble in strong muriatic acid, nor are they affected by a strong solution of caustic potass. They are most probably siliceous.

I have not been able to discover the tentacles of the animal, though I have submitted them to the same process by which I observed them in *Leiopathes dichotoma*, as mentioned in my former paper; but I have seen sufficient of the internal structure of the animal to lead me to believe that in its general character it agrees with that of the other *Gorgoniadæ*.

5 0C 58



Fig. 1



Fig. 2



Fig. 3

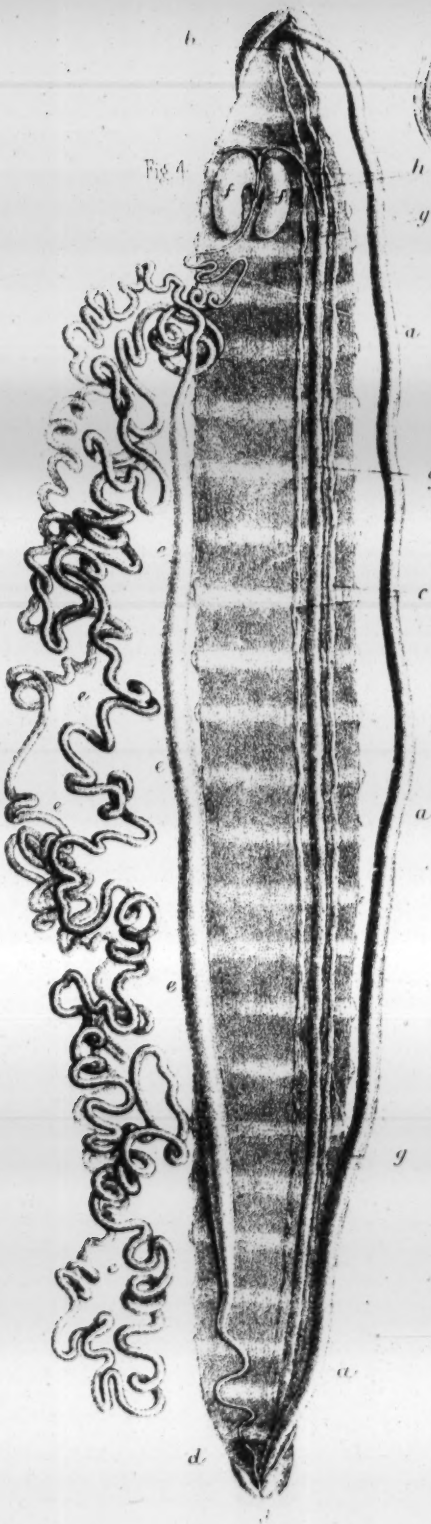


Fig. 4

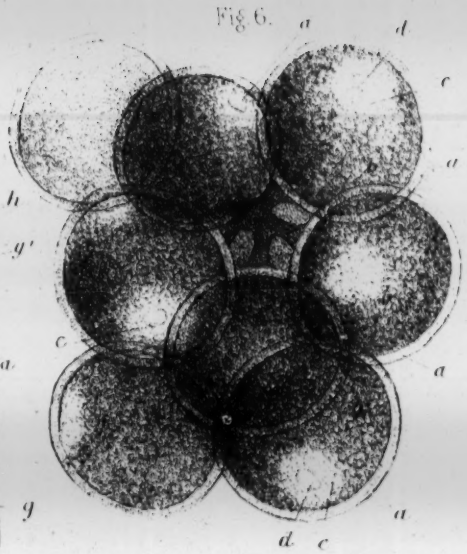


Fig. 5

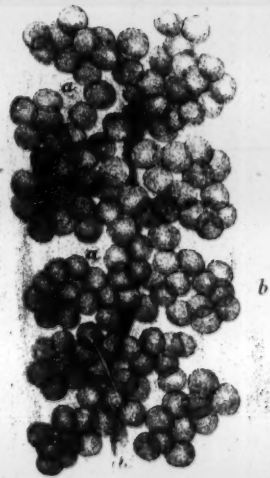


Fig. 6

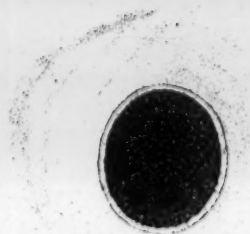


Fig. 7

124 *Pentastoma multisetum* Harley
Pentastoma polyzonum Harley

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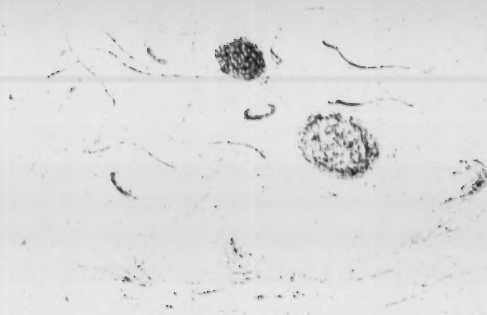


Fig. 10

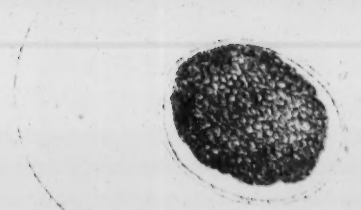


Fig. 11



Fig. 12

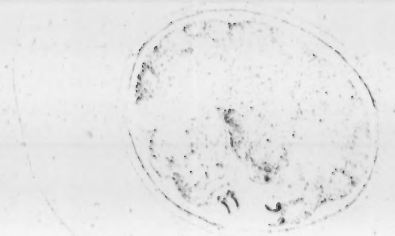


Fig. 13

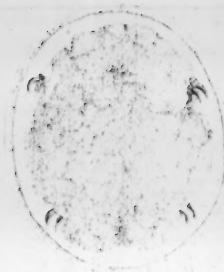
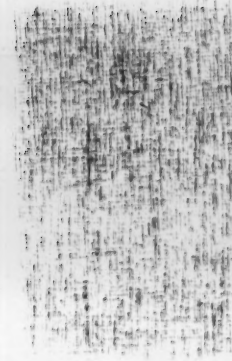
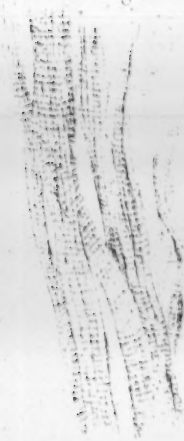


Fig. 14



PENTASTOMA MULTICINCTUM Harley
Ova in different stages of development

June 9, 1857.

Dr. Gray, F.R.S., V.P., in the Chair.

The following papers were read :—

1. ON THE ANATOMY OF A NEW SPECIES OF PENTASTOMA FOUND IN THE LUNG AND AIR-SAC OF AN EGYPTIAN COBRA. BY GEORGE HARLEY, M.D., F.C.S., OF UNIVERSITY COLLEGE, LONDON.

(Annulosa, Pl. XLVI., XLVII.)

Having lately had the opportunity of dissecting a fine specimen of Entozoon, which, as far as I am aware, is an entirely new and undescribed species, a brief description of its anatomy may perhaps prove interesting to the members of the Society.

The worm which I am about to describe was found in the lung of the Egyptian Cobra, *Naja Hage*, kindly sent to me for examination by D. W. Mitchell, Esq. I was fortunate enough to obtain four fine specimens, nearly all of equal size, from the same animal. They measure from 4 to 5 inches in length, and from 5 to 8 lines in circumference. In external characters they seem to resemble an Entozoon found in the lung of a Cobra by Dr. Crisp, a short description of which was given in the Proceedings of the Society for 1833, p. 22, Annul. pl. 30. fig. 7, by Dr. Baird; who spoke of it as an undescribed species of *Pentastoma*, and gave it the name of *Pentastoma annulatum*. Dr. Baird's description of the specimen is, however, very short, and unfortunately incomplete, in consequence of his having seen only a small specimen, and that even imperfectly, on account of the most important fact, the head remaining imbedded, and hidden from view in the lung of the snake. I think it probable, however, that the animal which he described is one of the same species as I have obtained specimens of.

External characters.

The body of the entozoon is of a white colour, elongated, cylindrical and strongly ringed (Pl. XLVI. fig. 1). It begins with a round obtuse head, attached to the trunk by a short somewhat narrow neck. The body then gradually widens for the first three lines, where it measures in the largest specimen ($4\frac{3}{4}$ inches long) 8 lines in circumference, and from here down to within a few lines of the caudal extremity, continues of nearly the same diameter. Below this point it becomes regularly narrower the nearer we approach to the posterior end, which terminates obtusely. The caudal extremity is almost of the same diameter as the head. The rings which are, as before mentioned, very strongly marked, commence close to the posterior part of the head, and for the first three or four lines, gradually in-

crease in size and distance from each other. They then continue of the same relative size and distance apart (2 lines) till within about half an inch of the posterior extremity, when they again, however, become smaller and more closely approximated. In all the four specimens which I examined, the rings were twenty-seven in number, and where largest, projected nearly half a line from the surface of the body.

In the fresh specimen, when examined with a pocket lens, the exterior of the rings appeared mottled with faint white-coloured spots. They were and still are quite opaque, whereas the intervening tissue is so thin and transparent, that the internal viscera can be seen through it. A number of white bands or cords appear to connect one ring with another; the bands are largest in the lateral and dorsal regions. A dark-coloured line extends along the back throughout the whole length of the body: this, as I shall afterwards have occasion to show, is the digestive canal.

On the under surface, in the centre and near to the anterior margin of the head, which is slightly flattened from before backwards, is a round foramen, the mouth. On either side of this opening are two depressions, equidistant from each other, each containing a prehensile hooklet of a bright yellow colour. These hooklets in shape closely resemble a cat's claw, which can be extended and retracted at pleasure, and when completely drawn in, the points of them can be neither seen nor felt. The obtuse posterior extremity has a deep cleft across it, and on its under surface are two openings, one in front of the other: the anterior is the entrance to the vagina, the posterior the anal aperture.

Anatomy of the Entozoon.

Parietes.—The whole body is invested with a delicate, smooth, transparent cuticle, which can be readily detached by slight maceration. Beneath the cuticle are two layers of striated muscular fibres (Pl. XLVII. fig. 13), a vertical and a transverse layer;—the longitudinal fibres are by far the most developed;—the circular are in some places entirely wanting. The projecting rings, on the other hand, are not composed of striated muscular fibres, but consist of fibro-areolar tissue. They seem to serve as fixed points of action for the longitudinal muscles; appearing to supply, in fact, the place of a hard skeleton. The interior of the abdominal cavity is lined by a fine transparent membrane, on which I thought I could detect a single layer of delicate pavement epithelium.

Digestive System.—The alimentary canal, in consequence of its peculiar dark saffron tint, is readily traceable from its commencement to its termination. It begins at the mouth, and runs in an almost perfectly straight line to the opposite extremity of the body, terminating, as was before mentioned, immediately behind the orifice of the vagina (Pl. XLVI. fig. 4, *a*). Close to its commencement it is of the diameter of a fine crow-quill, and may be said to continue of nearly the same size throughout its whole course. It lies directly

in front of the ovary and great nerves, and is almost entirely concealed from view by the innumerable tortuosities of the oviduct. It has four distinct coats, an internal mucous, an external serous, and two muscular layers, one running vertically and the other horizontally; both of which consist in great part of the striated variety of muscular fibres*. The interior of the alimentary canal is marked by longitudinal rugæ, from the surface of which long pyriform villi project.

Nervous System.—The distribution of the nervous system of this highly organized Entozoon is, in some respects, identical with that found in the *Linguatula tænioides*, so beautifully described by Professor Owen. The large ganglion, or brain, is situated close to the mouth, and is intimately connected with the œsophagus, to which it seems to send two filaments (Pl. XLVI. fig. 4, *b*). I could not, however, satisfy myself of the existence of an œsophageal ring. The distribution of the large pair of nerve cords, which extend almost throughout the whole length of the body, differs very materially from that found in the *Linguatula tænioides*; for, after passing over the fallopian tubes, instead of running down the sides of the ventral aspect of the body, they continue along the dorsum, behind the alimentary canal and close to the ovary (Pl. XLVI. fig. 4, *c*). They are at last gradually lost sight of a few lines above the anus.

Organs of Reproduction.—In attempting to describe the organs of reproduction in this animal, I shall begin at the vagina and trace them gradually upwards, for it was by following this course that I was enabled, with the aid of the microscope, to distinguish the different organs, and to ascertain the function of their various parts.

The orifice of the vagina is situated immediately in front of the anal aperture (Pl. XLVI. fig. 4, *d*). The vagina itself is about the thickness of a pin, and from 3 to 6 lines in length; it gradually widens out into the oviduct, or more correctly speaking, the uterus (Pl. XLVI. fig. 4, *e*). For about the first 6 inches the uterus has a greater diameter than the alimentary canal; it then however becomes gradually narrower, till its diameter does not exceed that of a fine knitting-needle, and continues of this size till within a few lines of its termination, where it contracts still more. At its upper point of attachment, which is opposite the third or fourth ring, its diameter is not greater than that of the vagina. In two of the specimens I measured the length of the uterus, and found it to be 40 inches from the orifice of the vagina to the place of its attachment opposite the third or fourth ring. Thus it is seen to be nearly ten times the length of the entozoon in which it is coiled up. Although it conceals the alimentary canal, it is not, as in the case of the *Linguatula tænioides*, coiled round it; neither has it the ferruginous tint spoken of by Owen as belonging to the oviduct of the latter species. It is, on the contrary, of a pale straw-colour when full of ova, and almost quite colourless when empty. Its parietes are thin

* Ficinus and Valentin found indistinctly striated muscular fibres in the human stomach.

and transparent, and when viewed with the microscope are seen to be muscular, both longitudinal and circular fibres being distinctly visible. They consist of the non-striated variety of muscular fibre (Pl. XLVII. fig. 14). The fully developed ova are not attached to the parietes of the uterus by any connecting cellular substance, for on being cut across, the ova immediately flow out, and the parietes collapse. On the other hand, the imperfectly developed ova found in the upper portion of the uterus have a darker colour, and seem to be adherent by a glutinous material not only to each other, but also to the walls of the organ.

At the upper point of its attachment to the abdominal parietes are two oblong bodies of a dull white colour (Pl. XLVI. fig. 4, *ff*). These bodies open directly into the uterus. On examination they were found to be filled with spermatozoa in all the various stages of development, from the primitive granule up to the perfectly formed spermatid filament (Pl. XLVII. fig. 8). The filaments are of considerable length, and are amassed together in bundles of tolerable size (Pl. XLVII. fig. 8, *a*). Some of the fully formed spermatozoa with large heads measured $\frac{1}{10}$ mm. in length, and a few were even longer still.

A question of great interest and importance might be here raised regarding the special function of these oblong bodies, which, as I have just mentioned, contain innumerable spermatozoa in various stages of development. Are they the spermatheca or copulatory pouches of a female; or are they to be regarded as the testicles or male organs of generation of a hermaphrodite? I shall defer the consideration of this important point until after I have terminated the description of the animal.

The organs just alluded to, which, for the sake of brevity, I shall speak of as testicles, are attached to the parietes of the entozoon by strong bands of striated muscular fibres. At the upper part of their point of union, the uterus divides into two fallopian tubes, which gracefully curve round the digestive canal, pass behind the two great nerve cords, and after getting between them, reunite to form the ovary (Pl. XLVI. fig. 4, *gg*). The ovary is of a ferruginous colour, intimately attached in the mesial line to the dorsal aspect of the animal, and continued downwards between the nerve cords and behind the alimentary canal to within about 5 lines from the anus, where it suddenly terminates in a blind sac.

When viewed through a lens, the coats of the ovary are seen to be thin and transparent, and not closely surrounding their contents. They are here and there thrown into loose folds, and the ova can be distinctly observed in their interior, like a series of bunches of grapes closely strung together (Pl. XLVI. fig. 5). When the ova are highly magnified, they are recognized to be spherical bodies attached together by little peduncles, and to consist of a tunic or yolk-sac, a granular yolk and a germinal vesicle. I even detected in many of them the germinal spot (Pl. XLVI. fig. 6 *d*.).

On tracing the development of the ova, I found that the germinal spot disappeared from them as soon as they had passed out of the

fallopian tubes into the upper attached portion of the uterus,—no doubt, in consequence of the ova having been impregnated during their transit through that portion of the uterus into which the testicles open as already described. From this point downwards the progressive development of the ova can be readily followed. But as this communication has already extended beyond the limits I had marked out for it, instead of giving my readers a detailed description of the process of development, I shall take the liberty of referring them to the accompanying figures, which accurately represent the different appearances observed in the ova from the time of their exit from the ovary till their arrival in the vagina (Pl. XLVI. fig. 7, Pl. XLVII. figs. 9, 10, 11 and 12). I may here only further remark, that impregnation evidently takes place from above downwards, and that no spermatozoa in any stage of development could be detected in any part of the uterus; thus forbidding the idea of the animals having received the vivifying fluid from a separate male organ after the uterus had been filled with ova.

Having now completed my remarks upon the anatomy of the entozoon, I shall proceed to say a few words upon the important question of its sex, and I may premise these words by observing that it appears to me that some naturalists are at present running to extremes in attempting to find separate sexes in all animals, and to prove that there is no such thing as hermaphroditism in nature. Ultra views are at all times to be condemned, and I think in no case more so than the present, when the obstacles besetting the path to a definite conclusion are as complicated as they are numerous. A few years ago several members of the genus *Pentastoma* were regarded as true hermaphrodites by the most distinguished naturalists; and now since some of the species have been ascertained to have separate sexes, a recent writer has ridiculed the idea of a single example of this large genus having male and female organs of generation united in one individual. I do not intend to say that he has erred in jumping too hastily to his conclusion, but merely to remark that the entozoon which I have described in the foregoing pages, if not strictly belonging to the genus *Pentastoma*, is yet in many of its characters very closely allied to it, and that it still remains to be shown that this animal is not a hermaphrodite. As there are two sides to every question, and as it is wrong to give an opinion before both have been examined, I shall briefly state my reasons for thinking it possible that the animal we have just been considering is a female, and that the true male organs of generation are to be sought for in another individual.

The *Linguatula tænioides*, which is the nearest allied species to my entozoon, was described by naturalists of the very highest standing, such as Owen, Valentin, Von Siebold, Dujardin and others, as a hermaphrodite, in consequence of their finding that it possessed, in each individual, organs containing the female and organs containing the male reproductive materials in different stages of their development; and that these organs were not only so arranged as to allow of the vivifying contents of the one coming into contact with those

of the other ; but that a common canal resulting from the union of the channels through which the ova from the female and the spermatic filaments from the male organ passed, contained the fructified result of such a reunion, as that of the opposite sexes could alone secure.

The presence of a product in an organ, however, not being sufficient to ensure that it was produced by, and not introduced into, that organ, the question naturally arose in the minds of some, whether we were justified in regarding the organs in the *Linguatula tænioides* containing the ova, as ovaries, and those containing the spermatozoa as testicles. At first some doubted, and at last others have denied, the reunion of the sexes in this species of *Pentastoma*.

Van Beneden, the champion of the latter class of naturalists, states* that in four examples of the species of "*Linguatula de Diesing*," and in two others of another kind found in the lung of a Boa, he ascertained the male and female organs of generation to be in different individuals, and that Owen, Valentin, Von Siebold and others, have erred in describing the *L. tænioides* as a hermaphrodite. He describes the testicle in the male as being about $\frac{1}{3}$ of the length of the body, and lying behind the alimentary canal, consisting of a pouch with thin parietes, terminating behind in a cul-de-sac. From the upper part of the testicle branch off two vasa deferentia, and from the end of each, floats an organ which he looks upon as a prostate. These open into round vesicles constricted in the middle, each containing a coiled-up tube, which he describes as a penis.

I have quoted Van Beneden's description of a male *Pentastoma*, because in the nasal fossa of the Cobra, from which I obtained my four specimens of entozoa, I found two small *Pentastoma* of about $1\frac{1}{8}$ inch in length (Pl. XLVI. fig. 2) ; and on dissecting one I found it to agree in every respect with Van Beneden's description of the male *Linguatula*. The question then occurred to me, whether or not I might look upon them as being two males and my large specimens four females of the same species. The two small entozoa found in the nasal fossa look exactly like some other *Pentastoma* which I obtained from the cellular tissue of a Morocco Cobra. Even taking into account the fact that the male is often much smaller than the female entozoon, their external characters and apparently their mode of life are so very different from those of the large worms found in the lungs, that I can scarcely believe them to belong to the same species of animal. Even admitting that they were the males of my large entozoon, I do not see how they could get their spermatozoa into the spermatheca of the large animals. Van Beneden says he found an opening for the penis to get out immediately behind the mouth, but then this organ, which he calls the penis†, is only a few lines in length, and consequently could project the seminal fluid but a trifling way up the uterus, which, as before mentioned, is 40 inches long. The pouches containing the semen are situated too at the

* Ann. des Sciences Naturelles, 3me série, tome 11-12, p. 325.

† I examined what he took for the penis, and I have some doubts if it, or rather they, for there are two, are really what he supposes them to be.

very top of this immensely long duct. It may be said that the spermatozoa could find the way up themselves. That I admit might be the case if they were fully developed, and consequently moving filaments; but it would be impossible for them to get up in the undeveloped condition in which some of them are found in the pouches. Besides this, if they were injected into the vagina, why did they not impregnate any of the ova on their passage up? Impregnation is distinctly seen to have taken place from above downwards, not from below upwards, or in any irregular manner.

The only satisfactory way of accounting for the presence of spermatozoa in different stages of development in the copulatory pouches, supposing that they were not generated there, would be to find a channel by which they might enter without having to pass through the 40 inches of oviduct. Now I have carefully searched for such a channel and can find no trace of one. Neither can I find any opening into the animal near to the spermatheca except the mouth, and I do not think any one will consider that a likely door for them to enter at.

I admit that my not being able either to detect a tube or an opening into the spermatheca does not incontrovertibly prove that no such tube or opening exists. But I think that fact taken in connexion with the others, especially that of the spermathecal filaments being found in various stages of development in the pouches, is tolerable evidence in support of the idea that the organ containing the spermatozoa is the one which generated them. And until we hear some more conclusive arguments on the opposite side, we may consider ourselves justified in regarding the spermatheca as testicles, and calling the entozoon a true hermaphrodite.

In conclusion, I have a word to add regarding the habits of the entozoon I have been describing. I found two of them with their heads projecting through the air-sac of the Cobra, and firmly fixed by their prehensile hooklets to a large blood-vessel; from which I conclude that they feed directly upon the blood of the animal they inhabit. They appear to be blood-suckers in the strictest sense of the word. In order to get to the blood-vessels to which they anchor themselves by their hooks, the worm has to pierce the surrounding tissues, and the hooks are no doubt made retractile into the depression in order to enable the animal again to withdraw its head after it has finished its meal.

I found in the collection of Dr. Sharpey a fine specimen of an entozoon closely resembling the one I have been speaking of (Pl. XLVI. fig. 3); the only difference being that it is shorter and thicker, has only nineteen strong projecting rings instead of twenty-seven, and that its tail is conical and not cleft; farther, that the vagina is about a line in front of the anus. Unfortunately no history is attached to this specimen.

DESCRIPTION OF ANNULOSA, PLATES XLVI. AND XLVII.

PLATE XLVI.

- Fig. 1. The entozoon; natural size.
a. The head; the under surface showing the mouth and four prehensile hooklets (two on either side of the buccal aperture).
b. The caudal extremity, showing the cleft across it.
c. The projecting rings.
- Fig. 2. Small entozoon found in the nasal fossa of the Cobra; natural size.
- Fig. 3. Large entozoon found in Dr. Sharpey's collection.
a. Head, with the mouth and four hooklets.
b. The conical caudal extremity.
c. The entrance to the vagina.
d. The anal aperture.
- Fig. 4. Entozoon, fig. 1, dissected. Opened on the dorsum a little to the left of the mesial line.
a, a. The digestive canal.
b. The œsophageal ganglion.
c. The great nerve cords.
d. The vagina.
e, e. The uterus or oviduct.
f, f. The copulatory pouches or testicles (?).
g, g. The ovary.
h. The fallopian tubes.
- Fig. 5. Portion of the ovary.
a, a. The ova, resembling bunches of grapes.
b, b. The homogeneous membrane loosely covering the ova.
- Fig. 6. A bunch of ova highly magnified.
a. The yolk-sac, consisting of a double wall.
b. The granular yolk.
c. Germinal vesicle: indicated by the light-coloured space.
d. Germinal spot.
- Fig. 7. Impregnated ovum from the upper portion of the uterus.

PLATE XLVII.

- Fig. 8. Spermatozoa found in the copulatory pouches or testicles (?).
a, a. Granular cells.
b. The imperfectly developed spermatic filaments amassed together in large bundles.
c. Fully formed spermatozoa.
- Fig. 9. Ovum taken from the uterus 6 inches below its upper attachment.
a. The granular yolk becoming condensed and retracted from the yolk-sac.
- Fig. 10. View of ovum in a more advanced stage of development.
- Fig. 11. Profile view of a fully developed ovum. Two sets of hooklets are here shown.
- Fig. 12. Face-view of the same, in order to show the arrangement of the four pairs of hooklets, and general form of the animal.
- Fig. 13. Striated muscular fibres from the parietes of the parent entozoon.
- Fig. 14. Magnified view of a small portion of the uterus, to shew its double layer of non-striated muscular fibres.

2. DESCRIPTION OF THIRTEEN NEW SPECIES OF PALUDINACEA
FROM CEYLON, IN THE COLLECTION OF HUGH CUMING, ESQ.
By H. DOHRN.

Genus 1. PALUDINA.

1. PALUDINA CEYLONICA. *Testa ovato-conica, perforata, solidiuscula, viridis, versus apicem fuscescens; spira magis minusve elevata, exserta; anfractus convexi, ad suturam et basin obsolete, medio acute carinati; spiraliter et longitudinaliter striata; sutura simplex, impressa; apertura ovata, intus alba, peristoma subincrassatum, reflexiusculum, nigrum.*
Long. 21, lat. 16; apert. long. $12\frac{1}{2}$, lat. 9 mill.

Genus 2. BITHYNIA.

1. BITHYNIA STENOTHYROIDES. *Testa ovata, tenera, alba vel fulva, pellucida, nitida; anfractus 4-5 convexiusculi, ultimus efflatus, ventricosus, ad basin leviter carinatus, antice descendens; sutura simplex; apertura oblongo-ovata, parum coarctata, ad basin acuta, alba. Operculum oblongo-ovatum, testaceum, crassum, concentricum striatum.*

Long. $5\frac{1}{2}$, lat. $4\frac{3}{4}$; apert. long. 3, lat. 2 mill.

Ceylon, Nilgherries.

This species has some characters of *Stenothyra*. The last whorl is unusually great, the mouth somewhat contracted, but the general aspect is that of *Bithynia*.

2. BITHYNIA INCONSPICUA. *Testa oblongo-conica, tenera, alba vel fulva, pellucida; spira acuta; anfractus 4-5 convexiusculi, sub lente leviter longitudinaliter striati; apertura oblonga. Operculum testaceum, concentricum.*

Long. 5, lat. $3\frac{1}{2}$; apert. long. $2\frac{1}{2}$, lat. $1\frac{3}{4}$ mill.

In shape nearly allied to our common *B. tentaculata*, but differing in size; the whorls are rounder, broader in proportion to the height, and flatter than in *B. orcula*, Bens., and the whole form is more conic.

Genus 3. PALUDOMUS.

1. PALUDOMUS FULGURATUS. *Testa oblongo-ovata, tenera; spira elevata, apice obtuso, leviter longitudinaliter et spiraliter striata, late olivacea, fusco fulgurata, ad suturam impressam fusco fasciata; anfractus quatuor convexi, supra medium obsolete carinati; apertura oblonga, simplex, albida, lineis fuscis, pellucentibus. Operc.?*

Long. 16, lat. 13; apert. long. 11, lat. 6 mill.

2. PALUDOMUS NASUTUS. *Testa solida, oblongo-conica, apice acuto, nigrescens, versus apicem albicans, ad suturam lineam ralde impressa distincta, obsolete decussata; anfractus quatuor*

convexusculi, ultimus medio leviter angulatus; apertura simplex, oblonga, albida. Operc.?

Long. 12, lat. 8; apert. long. $7\frac{1}{2}$, lat. $4\frac{1}{2}$ mill.

3. *PALUDOMUS SPHÆRICUS. Testa solida, globosa, olivacea, parum nitida, confertim longitudinaliter et transverse striata; spira depressa, exserta; anfractus rotundati, fasciatim spiraliter nigro-maculati; sutura simplex, alba.*

Long. 18, lat. 17; apert. long. 15, lat. 12 mill.

This species is still rounder than *P. globulosus*, R., and different in the markings and sculpture: *P. globulosus* is in the upper part of the whorls slightly angulated; the whorls of *P. sphæricus* are round.

4. *PALUDOMUS SOLIDUS. Testa ovato-oblonga, solidissima, flava, brunneo-maculata; spira exserta; anfractus convexi, spiraliter sulcati, sub lente longitudinaliter striati; sutura impressa; apertura crassa, alba, semicircularis. Operculum corneum, nigrescens, concentrice striatum, nucleo sinistro.*

Long. 19, lat. $14\frac{1}{2}$; apert. long. 13, lat. 10 mill.

5. *PALUDOMUS DISTINGUENDUS. Testa ovata, olivacea, nitida, fasciis nigris fulguratis longitudinaliter picta, spiraliter et longitudinaliter striata; spira exserta; apertura ovata, cærulescens; peristomate nigro, obsolete dentato; margine columellari planato, fasciis nigris, pellucentibus.*

Long. 25, lat. 19; apert. long. 18, lat. $12\frac{1}{2}$ mill.

Nearly allied in shape to *P. sulcatus*, but differing in the sculpture and the inside of the mouth.

6. *PALUDOMUS CUMINGIANUS. T. globosa, solida, olivaceo-fusca, obsolete spiraliter sulcata; spira valde depressa, exserta; anfractus ultimus ceteros superans, ad suturam in formam canalis impressus; apertura magna, obliqua, flavescens, intus albida, lineis nigris undatis longitudinaliter distincta.*

Long. 33, lat. 34; apert. long. 30, lat. 24 mill.

Belongs in the same group with *P. Gardeneri*, R.; very distinct in the deep channel-like impression on the upper part of the whorl, and in the large size of the mouth.

7. *PALUDOMUS DRÔMEDARIUS. Testa oblongo-ovata, nigra, obsolete spiraliter, longitudinaliter striata; anfractus convexi, ultimus antice valde deflexus; apertura subcircularis, alba, obsolete dentata, interdum flavo-cincta. Operculum subtriangulare, corneum, nucleo laterali dextrorso.*

Long. 29, lat. 21; apert. long. $20\frac{1}{2}$, lat. 16 mill.

8. *PALUDOMUS SKINNERI. Testa ovata, nigricanti-olivacea, confertim costis squamatis spiraliter cingulata, supra medium obsolete carinata; apertura semicircularis, alba, intus cærulescens.*

Long. 35, lat. 32; apert. long. 29, lat. 21 mill.

I would rather consider this as a variety of *P. loricatus*, R. ; but as Mr. Cuming, who has a particular interest for this genus, said that he was convinced it was a distinct species, I give the description of it.

9. *PALUDOMUS SWAINSONI*. *Testa ovata, solida, olivacea, costis nigris spiralibus ornata, obsolete spiraliter et longitudinaliter striata; spira exserta; anfractus convexi, ad suturam nigricantem depressi; apertura ovata, albida, obsolete dentata, interdum fusco-maculata.*

Long. 25, lat. 23; apert. long. 21, lat. 12 mill.

Allied to *pictus*; but differs in having black ribs.

10. *PALUDOMUS NODULOSUS*. *Testa oblongo-ovata, læte olivacea, longitudinaliter nigro fulgurata; spira exserta; anfractus costis tuberculosis spir. liter cingulati, sutura crenulata; apertura subcircularis, nigra, intus albida, lineis nigris pellucen-
tibus.*

Long. 27, lat. 21; apert. long. 20, lat. 16½ mill.

3. LIST OF BIRDS COLLECTED BY MR. THOMAS BRIDGES, CORRESPONDING MEMBER OF THE SOCIETY, IN THE VALLEY OF SAN JOSÉ, IN THE STATE OF CALIFORNIA. BY PHILIP LUTLEY SCLATER, M.A., F.L.S. ETC.

Mr. Bridges has requested me to bring before the notice of the Society a series of birds which he collected in the Valley of San José, at the southern extremity of the Bay of San Francisco. There are examples only of 33 species, but many of these are interesting—the W. American forms being very little known in Europe, although the Museums in the United States are well supplied with specimens resulting from the many recent expeditions into the west. The only list of Californian birds at all complete is that published by Dr. Gambel in the first volume of the second series of the Journal of the Academy of Natural Sciences of Philadelphia. M. Cassin's beautiful work on the 'Birds of California, Oregon, &c.' has been unfortunately discontinued for the present, at the termination of the first volume. Had that been brought to a conclusion, there would have been much less still wanting to be known concerning the ornithology of the western regions of N. America.

Mr. Bridges' collection contains examples of the following species:—

1. *ACCIPITER FUSCUS* (Gm.).
2. *TINNUNCULUS SPARVERIUS* (L.).
3. *CIRCUS HUDSONIUS* (L.).

4. *GLAUCIDIUM CALIFORNICUM*, Sclater, P. Z. S. 1857, p. 4: *Glaucidium infuscatum*, Cassin, Birds Cal., Oreg., &c. p. 189 (nec Temminck).

This little Owl is quite distinct from the S. American *passerinoides*, as stated by Mr. Cassin himself, and from every other Mexican or S. American species with which I am acquainted. Mr. Cassin has called it *infuscatum*, imagining it to be the true *Strix infuscata* of Temminck; but I have no doubt that that name is correctly applicable to the S. American *passerinoides*. It occurs only in the first part of Temminck's 'Manuel d'Ornithologie' (p. 97), where the author says he intends to describe a Brazilian species nearly allied to the European *G. passerinum*, under the title *Strix infuscata*. It is quite evident that he afterwards changed his mind on this point, and called the same bird *passerinoides* when he came to figure it in the 'Planches Coloriées.' Under these circumstances, therefore, it is not correct to apply the term *infuscatum* to the Californian species.

5. *SELASPHORUS RUBER* (L.).

6. *SELASPHORUS ANNA* (Less.).

7. *LANIUS EXCUBITORIDES*, Sw. Northern Zool. p. 123. pl. 34.

This appears to be the western representative of *L. ludovicianus*. It has been often united with that species by modern writers, but, I believe, erroneously, being easily distinguishable by its whitish rump. In Texas both the two species seem to be equally abundant. See Woodhouse's Appendix to Report of Zuni and Colorado Rivers Expedition, p. 76.

8. *TURDUS MIGRATORIUS* (L.).

9. *TOXOSTOMA REDIVIVUM*, Gamb. Journ. Ac. Sc. Phil. i. p. 42.

There are, I believe, four species of this curious form now known to occur within the limits of the United States, (1) the present *T. redivivum* (Cass. B. Cal. pl. 42) from California; (2) *T. leontii* (Lawrence, Ann. Lyc. N. Y.) from the Rio Hila; (3) *T. curvirostre* (Sw.) (*Pomatorhinus turdinus*, Temm., *T. vetula*, Wagl.) from Mexico and Texas; (4) an undescribed species in the collection of the Smithsonian Institution at Washington, discovered during one of the recent expeditions in New Mexico.

10. *PSALTRIA MINIMA* (Gamb.): Cassin, B. Cal. p. 20.

11. *SITTA ACULEATA*, Cass. Pr. Ac. Sc. Phil. viii. p. 254.

Recently separated by Mr. Cassin from the eastern *Sitta carolinensis*.

12. *ANTHUS LUDOVICIANUS* (Gm.).

13. *SIALIA MEXICANA* (Sw.).

14. SAYORNIS PALLIDA (Sw.): *Tyrannula pallida*, Sw. Phil. Mag. 1827, p. 367; *M. saya*, Bp. Am. Orn. pl. 2. f. 3.

15. SAYORNIS NIGRICANS (Sw.); *Tyr. nigricans*, Sw. Phil. Mag. 1827, p. 367.

16. CARPODACUS RHODOCOLPUS, Cab. (*C. familiaris* Americanorum.)

See my remarks on this species in P. Z. S. 1856, p. 304.

17. PIPILO FUSCUS (Sw.); Cass. B. Cal. pl. 122.

18. PIPILO OREGONUS, Bell, *Pipilo arcticus*, ex California et Oregon auct.

19. ZONOTRICHIA GAMBELLI (Nutt.); Gambel in Journ. Ac. Phil. i. p. 50.

It is doubtful, I think, whether this species is distinct from the eastern *Z. leucophrys*.

20. AGELÆUS GUBERNATOR (Wagl.).

21. STURNELLA NEGLECTA (Aud.).

22. CYANOCITTA STELLERI (Pallas); Gamb. in Journ. Ac. Phil. i. p. 45.

23. CYANOCITTA CALIFORNICA (Vig.); Gamb. ibid. p. 45.

24. MELANERPES FORMICIVORUS (Sw.); Cass. B. Cal. pl. 2.

25. MELANERPES RUBER (Gm.).

26. PICUS HARRISI (Aud.).

27. PICUS GARDINERI (Aud.).

These two last birds seem to be the western representatives of *Picus villosus* and *P. pubescens*.

28. PICUS NUTTALLI, Gamb. R. Ac. Sc. Phil. i. p. 259. *Picus wilsoni*, Malh. R. Z. 1849, p. 529.

This bird was erroneously united by Mr. Gambel (after describing it as new) to *Picus scalaris*, and is figured under that name, Journ. Ac. Phil. pl. 9. f. 2, 3. See P. Z. S. 1856, p. 307.

29. COLAPTES MEXICANUS (Sw.).

30. CALLIPEPLA PICTA, Gould, Mon. Odont. pl. 15.

31. CALLIPEPLA CALIFORNICA, Gould, Mon. pl. 16.

32. BOTHAURUS LENTIGINOSUS (Mont.).

33. ÆGIALITES VOCIFERUS (Wils.).

4. NOTE ON THE UPLAND GOOSE.
BY PHILIP LUTLEY SCLATER, M.A., F.L.S. ETC.

The new "Upland Goose" recently received by the Society from the Falkland Islands, is certainly the true Magellanic Goose (*Chloephaga magellanica*), Gmelin's name *magellanica* being founded on Buffon's Pl. Enl. 1006—a sufficiently recognizable representation of what seems to be the female of this species. See also Darwin's Zool. of the Beagle, Birds, p. 134, where "Upland Goose" is stated to be the name applied to this bird at the Falklands.

The bird, which has for several years, I believe, bred in the Society's Gardens, and is commonly called the "Magellanic Goose," is "The Ashy-headed Goose" (*Chloephaga poliocephala*) of the British Museum Catalogue of Gallinæ, Grallæ and Anseres, published in 1844.

This species is well figured in Gray and Mitchell's Genera of Birds (pl. 165), under the name *Bernicla inornata*. But it seems doubtful whether this is really the true *Anas inornatus* of King (Proc. Comm. Zool. Soc. i. p. 15).

The adults of both sexes of this Goose, which are now in the Society's Gardens, are coloured as nearly as possible alike, which is rather curious, if, as appears to be the case, in the nearly allied *C. magellanica* the male and female are quite different.

There are two other fine Geese which inhabit the southern extremity of the S. American continent—namely, *B. antarctica* (Gm.) and *B. melanoptera*, Eyton. Specimens of all these four species are in the British Museum.

5. DESCRIPTION OF A NEW GENUS OF GORGONIADÆ. BY DR.
JOHN EDWARD GRAY, F.R.S., V.P.Z. & ENT. SOC., F.L.S. ETC.
(Radiata, Pl. VII.)

ACANTHOGORGIA.

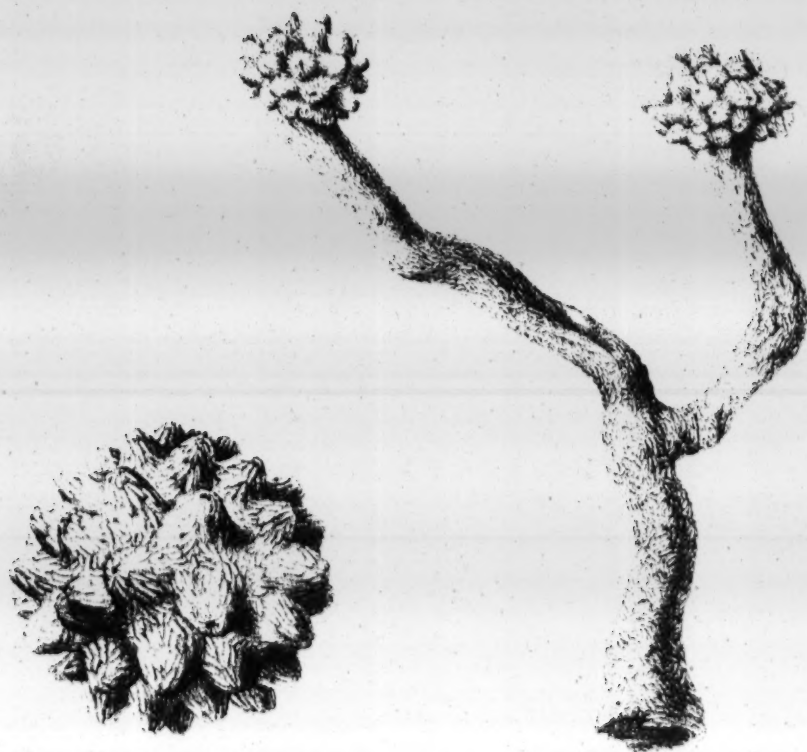
Coral branchy; branches free, cylindrical, slender, both of them almost entirely composed of transparent spicula; cells elegantly bell-shaped, contracted at the bottom, and less so rather below the aperture, spinulose, with eight equidistant lines of two or three series of diverging short spines; the mouth of the cell surrounded with numerous diverging, very slender, transparent, elongate spines, nearly as long as the cell. Axis horny black, more slender and brown near the tips.

Acanthogorgia hirsuta, Proc. Zool. Soc. 1851, Radiata, pl. 3. fig. 2.

Coral branched; branches nearly on the same plane, separate.

Hab. Unknown. British Museum.

This genus bears some relation to *Primnoa*, but the cell is armed externally with rows of short, thin, and its mouth with a series of



HEDALIA OCCIDENTALIS, Gray



delicate, elongated bristle-like spines, instead of the broad scale of that genus. From all other genera of the family it is most distinct and unlike.

The MS. description of this very curious coral was accidentally mislaid at the time at which it was read, and did not appear in the printed Proceedings of the Society. It was figured, by an error of the artist, for and under the name of *Nidalia occidentalis* in the Proceedings of the Zoological Society for 1851, Radiata, Pl. III. To rectify the error so committed, *Nidalia occidentalis* is now figured (Pl. VII.).

June 23, 1857.

Dr. Gray, F.R.S., V.P. Zool. & Ent. Soc., in the Chair.

The following papers were read:—

1. DESCRIPTIONS OF TWELVE NEW OR LITTLE-KNOWN SPECIES
OF THE SOUTH AMERICAN FAMILY FORMICARIIDÆ.

By PHILIP LUTLEY SCLATER, M.A., F.L.S. ETC.

(Aves, Pl. CXXVI.)

1. GRALLARIA FERRUGINEIPECTUS.

Supra pallide brunnea, olivaceo induta: loris et regione oculari et auriculari fulvo tinctis: subtus flavicanti-ferruginea, collo antico medialiter et ventre toto cum crisso albis: alis nigricantibus pallido brunneo limbatis, tectricibus alarum superioribus omnino nigricantibus, inferioribus autem cum campterio ochraceis: rostri nigri basi flavicante: pedibus pallidis.

Long. tota 3·8, alæ 2·6, caudæ 1·2, tarsi ·85.

Hab. In Venezuela, in vicin. urbis Caraccas (Levraud).

Mus. Paris.

2. GRALLARIA LORICATA.

Supra olivacea: pileo castaneo: oculorum ambitu, loris et gula tota albidis, fulvo tinctis: stria duplici gutturi utrinque nigra: pectoris et ventris lateralis plumis omnibus medialiter fulvo-albidis, undique late nigro marginatis: ventre medio et crisso albis, hypochondriis brunnescentibus: rostro clare brunneo, basi flavida: tectricibus subalaribus pallide brunneis.

Long. tota 4·0, alæ 2·8, caudæ 0·8, tarsi 1·6.

Hab. In Venezuela, in vicin. urbis Caraccas (Levraud).

Mus. Paris.

These two *Grallariæ* are of smaller size and have shorter tarsi

than the typical members of the genus. The bill also is shorter, broader, and more flattened, and furnished with many basal bristles. Together with Lafresnaye's *Grallaria nana*, they seem to form a subordinate group pointing towards *Conopophaga*.

3. HYPOCNEMIS MELANOPOGON.

♂. *Cinereus, subtus dilutior, ventre medio albicante; gula nigra: alis brunnescenti-nigris, tectricibus omnibus albo marginatis: cauda nigra rectricibus omnibus anguste albo terminatis: rostro nigro, pedibus fuscis.*

♀ aut ♂ junr. *Supra mari adulto similis, subtus gutture et pectore cinereo variegatis, gastræo albo, lateraliter cinerascentiore.*

Long. tota 4·5, alæ 2·5, caudæ 1·5.

Hab. In Peruvia Orientali, Chamicurros (*Hauxwell*).

Mus. Brit. et P. L. S.

This bird nearly resembles *H. pæcilonota* and *H. myiotherina* in style of colouring, but the bill is longer and more slender, and more like that of some of the species of *Myrmeciza*. From *H. pæcilonota* it is easily distinguished by the want of the white edgings of the interscapularies, from *H. myiotherina* by the restraint of the black colour to the throat, the want of the superciliary mark, and by the white termination of the rectrices.

I have two specimens of this species in my own collection, and there is one in the British Museum, which formed part of *Hauxwell's* collection from Chamicurros.

4. FORMICIVORA MELANA.

Fuliginoso-niger, subtus intensior; lateribus plumosis cum tectricibus subalaribus albis: alarum tectricibus et caudæ rectricibus albo terminatis: rostro et pedibus nigris.

Long. tota 4·0, alæ 3·1, caudæ 2·5.

Hab. New Grenada, Bogota.

Mus. P. L. S.

Obs. Similis *F. axillari*, sed colore corporis supra nigri nec plumbei dignoscenda.

5. FORMICIVORA UROSTICTA. (Pl. CXXVI. fig. 1.)

Cinerea subtus dilutior et magis albescens: plaga gulari elongata nigra: alis nigricanti-cinereis extus cinereo strictissime limbatis, tectricibus autem nigris, albo terminatis: cauda nigra, rectricibus omnibus albo late terminatis; rectricis unæ utrinque extimæ tertia fere parte apicali alba, hoc colore apud alias rectrices gradatim decrescente: rostro nigro, pedibus fuscis.

Long. tota 3·5, alæ 2·0, caudæ 1·2.

Hab. In Brasilia Orientali.

Mus. Brit. et P. L. S.

Obs. A *Formicivora axillari* et aliis affinibus colore subtus dilutiore, gula nigra magis restricta et præsertim rectricum apicibus late albis distinguenda.

6. FORMICIVORA BREVICAUDA.

Formicivora brevicauda, Sw., Zool. Journ. ii. p. 148.

♂. *Cinereus unicolor, plaga ovali in gutture et pectore superiore nigra: alis nigricantibus extus cinereo limbatis, harum autem tectricibus nigris albo terminatis: cauda brevi, colore nigro-cinerea, rectricum macula subapicali nigra, ipsarum autem apicibus albidis: rostro corneo, pedibus nigris.*

♀. *Olivascenti-brunnea, subtus clarior, capite subcinereo gutture albicantiore: tectricum alarum apicibus colore dilutioribus.*

Hab. In Brasilia Orientali prope urbem Bahia (Sw.).

Mus. Brit. et P. L. S.

Obs. Species ab auctoribus cum *F. axillari* et affinis confusa, sed crassitie minore, cauda brevior, colore corporis cinereo unicolore et plaga gutturali ovali bene definita facile dignoscenda.

7. FORMICIVORA HAUXWELLI. (Pl. CXXVI. fig. 2.)

Plumbea, subtus paulo dilutior, mento albescentiore: alis nigris, tectricibus omnibus albo terminatis, duas lineas albas formantibus; secundariis dorso proximis extus caudæ quoque tectricibus et rectricibus ipsis omnibus macula terminali alba præditis: uropygii plumis laxis, elongatis: cauda brevissima: rostro nigricanti-plumbeo, pedibus fuscis.

Long. tota 3·7, alæ 2·1, caudæ 9.

Hab. In Peruv. Orientali (Hauxwell).

Mus. Brit.

8. FORMICIVORA CINERASCENS.

Formicivora cærulescens?, Selater, P. Z. S. 1854, p. 112 (nec Vieill.).

Pallide cinerascens fere unicolor, subtus dilutior; interscapularium basibus albis: alis nigricanti-brunneis cinereo limbatis; tectricum apicibus albo guttulatis: cauda nigricante, rectricibus omnibus albo terminatis: rostro et pedibus nigris.

Long. tota 6·0, alæ 2·4, caudæ 2·2.

Hab. In Peruv. Orientali, Chamicurros (Hauxwell) et in ripis fl. Napo.

Mus. Brit.

Obs. Similis *F. cærulescenti* ex Brasilia sed rostro fortiore et longiore, cauda brevior et æqualior, colore corporis inferioris dilutior et campteriis non albis distinguenda.

I formerly referred this bird to Vieillot's *Form. cærulescens*, of which Menetries has given a figure in his 'Monograph of the Myiotherinæ,' pl. 6. But a comparison of specimens of both species, which are now in the British Museum, has convinced me that these two birds, though much resembling each other in plumage, are essentially distinct, and I have given above the characters by which they may be easily separated.

The example from Chamicurros, which was part of Mr. Hauxwell's fine collection, is not quite mature, and shows brownish colour-

ing beneath and upon the wings. Like *F. cærulescens*, this bird has only ten rectrices.

9. HERPSILOCHMUS PECTORALIS.

Cinereus, dorsi medii plumis albo mixtis; pileo nigro: fronte, superciliis et lateribus capitis albis: alis nigris, tectricum omnium apicibus albo guttatis, secundariis late, primariis stricte albo extus marginatis: cauda nigra, rectricis unæ utrinque extimæ dimidio apicali et proximarum trium apicibus gradatim decrescentibus albis; rectricibus duabus intermediis extus anguste albo marginatis et tectricum caudæ apicibus quibusdam eodem colore guttatis: subtus obscure cinereus, plaga magna in pectore antico nigro: rostro plumbeo, mandibula inferiore albicante: pedibus nigris.

Long. tota 5·0, alæ 2·1, caudæ 1·7.

My attention was first called to this species when looking through the specimens of this family in the Museum of the Academy of Nat. Sc. of Philadelphia.

There is also a single specimen in the British Museum, which came, I believe, from the same origin as the one at Philadelphia—that is from the Massena collection. There is no locality affixed.

In style of colouring this bird seems to come nearest to *H. pileatus*, but it is much larger in size, and the pectoral black patch renders it easily distinguishable from every bird of the family known to me.

10. DYSITHAMNUS XANTHOPTERUS.

Dasythamnus xanthopterus, Burm. Syst. Ueb. d. Th. Bras. iii. p. 81.

♂. *Capite colloque cinereis, fronte, regione superciliari et lateribus capitis albo striolatis: interscapulio et alis extus late rufis, illo dilutiore; dorso postico valde plumoso, colore viridescenti-rufo, hujus pennarum basibus cinereis: cauda nigricanti-cinerea, rectricibus extus rufescente marginatis: subtus albus, lateribus cervicis cinereis, ventris autem ochraceo-fulvis: rostri nigri mandibula inferiore pallida, pedibus nigris.*

♀. *Mari similis sed pileo rufo et subtus magis fusco-flavicans.*

Long. tota 5·5, alæ 2·4, caudæ 2·0.

Hab. In Brasilia Orientali.

Mus. Brit. et P. L. S.

The British Museum possesses the male; and I have a female specimen of this *Dysithamnus*, which is easily recognizable by its deep chestnut-red wings and back; the same in both sexes. The bend of the wing and whole of the upper coverts are of this colour, and I could hardly, therefore, at first think it possible that this could be the *Dasythamnus xanthopterus* of Burmeister (Syst. Ueb. d. Th. Bras. iii. p. 81), although his description agrees with the female of my species. But recollecting that *ξανθός*, though commonly used in Natural History as synonymous with the Latin *flavus* and English

"yellow," is also capable of bearing the meaning "auburn," or even "chestnut;" it appears to me that the name "*xanthopterus*," though eminently calculated to mislead as applied to this bird, is perhaps not sufficiently inaccurate to require to be replaced by a new name. I have therefore retained Professor Burmeister's appellation for this species. His single example was obtained in the vicinity of New Friburg in the province of Rio de Janeiro. Those in the British Museum and my own collection have the ordinary appearance of Brazilian skins, and are probably from Rio or Bahia.

I do not know what has induced Prof. Burmeister to attempt to change Cabanis's correctly formed generic term *Dysithamnus* into *Dasythamnus*; but in this, as in other instances, that author seems to undervalue the principle of priority, now universally recognized in the application of names in Natural History.

11. THAMNOPHILUS MELANOTHORAX.

Supra intense castaneus, remigibus alarum intus nigricanti-brunneis, lateribus capitis et corpore subtus ad imum pectus atris, hoc colore in ventrem sensim dilutiore: ventre et lateribus olivascanti-brunneis rufo tinctis: cauda unicolore castanea: rostro corneo, pedibus nigro-fuscis.

Long. tota 6·5, alæ 3·2, caudæ 2·8.

Hab. In America Meridionali?

Mus. Brit.

I have never met with but the single example of this curious bird which is in the British Museum. The genus *Thamnophilus* is the only one I know of in which it can be placed; but the bill is more conical and thicker and rather shorter than in the birds of that group, which most nearly approach it in size. There are two white spots on the outer secondaries of the specimen, but these are evidently the results of an incipient albinism.

12. THAMNOPHILUS MELANOCEPS.

Thamnophilus melanocephus, Spix, Av. Bras. ii. pl. 39. fig. 1. p. 28.

Ferrugineo-rufus, subtus clarior: capite toto undique et collo supero nigris: rostro et pedibus nigris.

Long. tota 7·0, alæ 3·2, caudæ 2·4.

Hab. Eastern Peru, Sarayaçu on the Ucayali (*Cast. et Dev.*).

Mus. Paris.

I was not acquainted with this fine species of *Thamnophilus* when I wrote the article on the arrangement of those birds in the 'Edinburgh N. Phil. Journal.' I have since seen several examples in the Museum of the Jardin des Plantes, which were obtained by MM. de Castelnau and Deville at Sarayaçu on the Ucayali. The irides are marked "orange."

2. ON TWO SPECIES OF BATS INHABITING NEW ZEALAND.

BY ROBERT F. TOMES.

(Mammalia, Pl. LIII., LIV.)

The first notice of the occurrence of *Cheiroptera* in New Zealand was given by Forster in 1772-74 *, who recorded the occurrence of a Bat flying over the sea-shore near the margin of a wood in the estuary of Queen Charlotte. It was shot, but being struck only in the wing, lived for two days. "He was described by me," says he, "and was drawn by my son." To this species Forster gave the name of *Vespertilio tuberculatus*. The description has been published in the work noted below, and the drawing is now in the British Museum. I shall have occasion to refer to both the description and the figure.

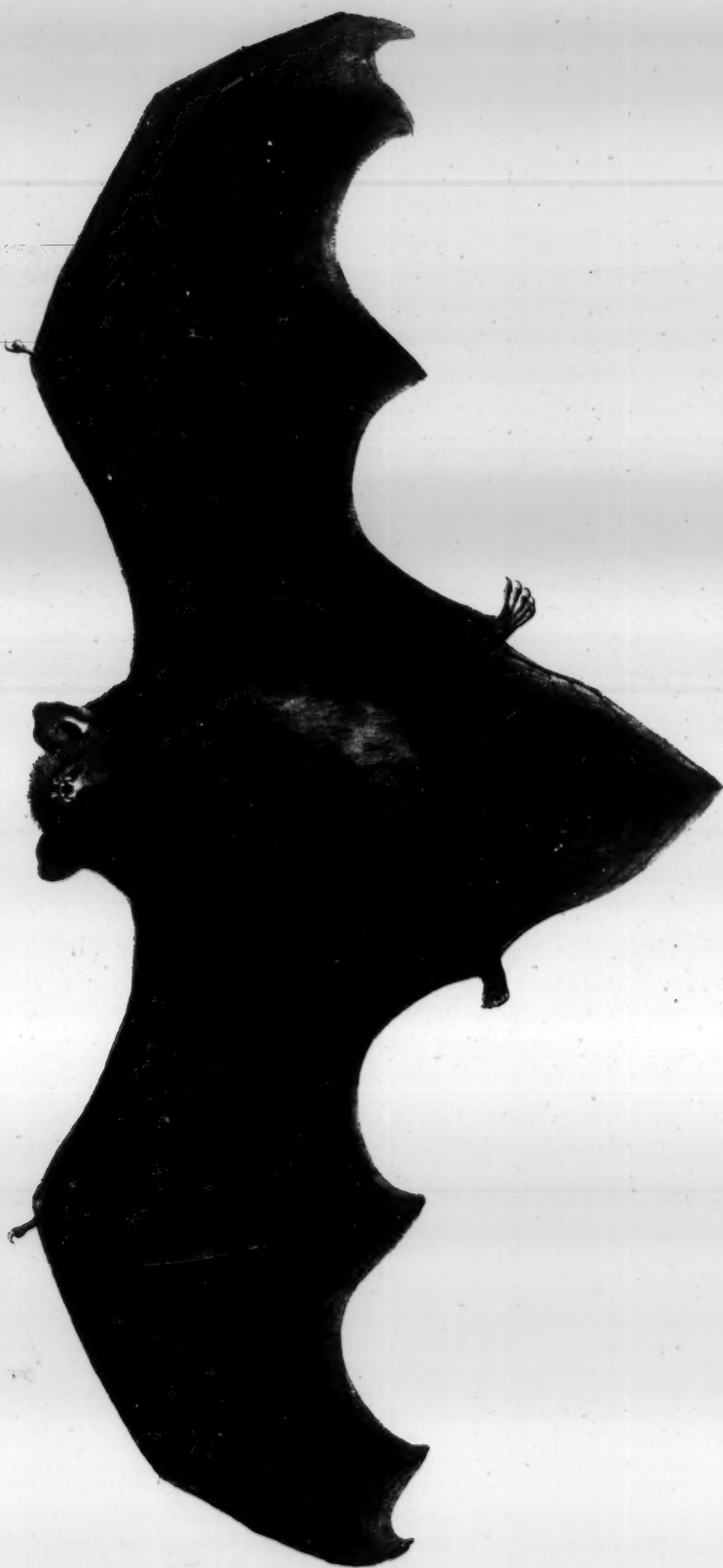
In 1843 Dr. Gray gave a very condensed description of a Bat in the Appendix to Dieffenbach's Travels in New Zealand, which he, believing to be the species mentioned in the MSS. of Forster, called by the same specific name. As Dr. Gray had specimens for examination, he at once perceived that they could by no means be considered as representatives of the genus *Vespertilio*, and that they did not even belong to the same family. Accordingly we find them in the 'Catalogue of the Mammalia of the British Museum,' published in 1843, placed in the Family *Noctilionina*, with the new generic appellation *Mystacina*, the old specific name *tuberculata* being retained.

Having some time since had occasion to examine some species of Bats in the Museum of the College of Surgeons, Prof. Quekett showed me one which had been recently received from New Zealand. It was not until I had been assured that it came directly from that country, in a bottle with a collection of New Zealand insects, that I could be persuaded that no mistake as to locality had been made. The forms presented by this example were so entirely unlike those of the only New Zealand species with which I was acquainted, that it was with considerable surprise I beheld a bat having pretty much the same forms and proportions as the common little English *Pipistrelle*.

Shortly afterwards an opportunity occurred of inspecting the fine collection of *Cheiroptera* in the Leyden Museum, which contains three examples of this supposed new species, but without any specific name. Finally, I detected other examples in the British Museum, amounting in number to five.

Being then satisfied of the existence of two species of Bats in New Zealand, I was anxious to pursue the subject further, and to determine, if possible, to which of these Forster had given the name of *V. tuberculatus*. The kindness of Dr. Gray speedily placed in my hands all the necessary materials. There could be no hesitation; the supposed new species was undoubtedly the one from which

* Descriptiones animalium in itinere ad maris australis terras per annos 1772-74 suscepto observatorum, edidit H. Lichtenstein. 1844.



STURNIRA TUBIFRONS

5 00 58

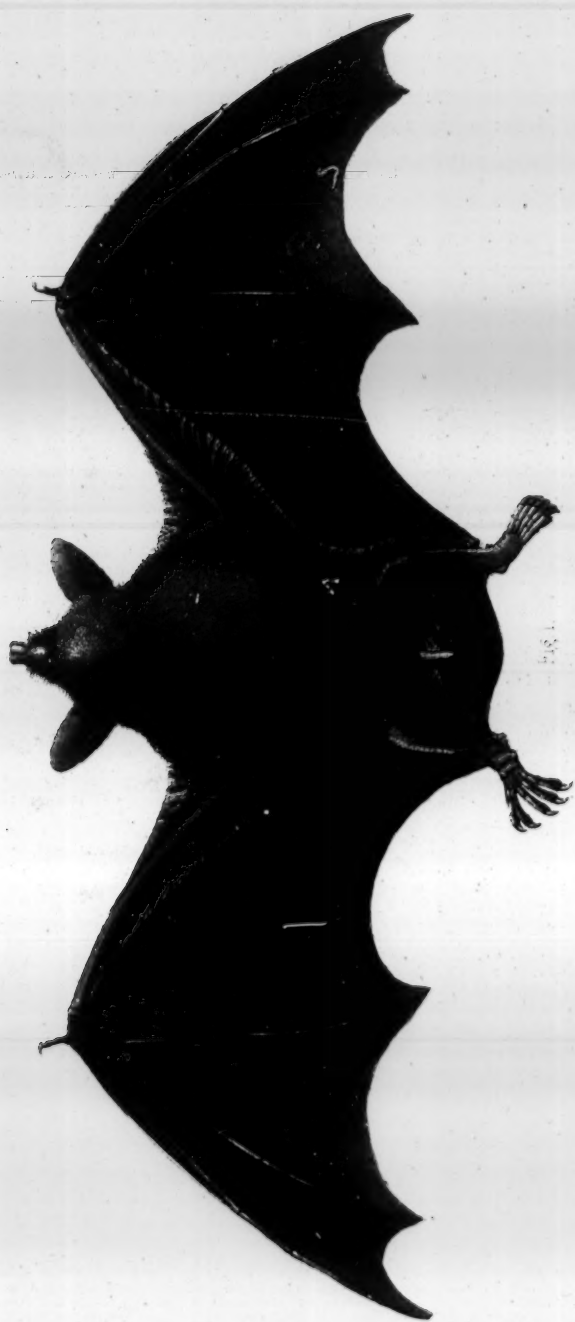


Fig. 1



MYSTACINUS AFRICANUS (Linn.)

5 00 58

Forster's drawing had been made, whilst the description, indicating the number of incisors, and other peculiarities, pointed unequivocally to the same conclusion.

As the above-mentioned zoologists have certainly been the first describers of two distinct animals, the names imposed by them will of course be retained; but it is much to be regretted that their specific names are similar; and the more so, as the one most recently given was clearly intended as a reference to the earlier known species.

The following description has been taken from the specimen in the College of Surgeons, and also from the specimens in the British Museum. With the advantages of specimens in spirit and in skin, it is probable that the description will be found tolerably correct, both as regards the form of the face, ears, &c., and the quality and colour of the fur.

Fam. VESPERTILIONINA.

1. *SCOTOPHILUS TUBERCULATUS*, Forster, Descript. Anim. p. 63. 1772-74, Icon. ined. in Brit. Mus. t. 1. (Pl. LIII.)

In form and proportions somewhat resembling the Pipistrelle of Europe; in size resembling Vesp. Nattereri; in colour very nearly similar to the Scotophilus Gouldii of Australia.

The muzzle is rather broad and obtuse, and moderately hairy. The nostrils are tumid, and of an oval form, with their inner margins more prominent than their outer, giving them a sublateral opening; they are distant from each other about two lines. The forehead is rather flat. The lower lip is broad, with the extreme edge naked, and rather thickly clothed with short hair on the chin, which becomes very thick on the throat. Immediately within the *symphysis menti* is a small but distinct wart.

The ears are rather small, oval-triangular, with a pretty uniform outline, and with a kind of plait or crease on the basal front of the inner margin, giving that part of the ear a slightly projecting lobe, not however of sufficient magnitude to interfere materially with its general uniformity of outline. The outer margin is not hollowed out, but maintains a pretty regular curve, and has its basal portion brought forward, in the form of a narrow rudiment of membrane, on to the cheek, where it ends immediately under the eye.

The tragus is short, rather broad, and of nearly uniform breadth, with the end round. It has, as in all the other species of this restricted group, an inward curvature.

The wing-membranes spring from the base of the toes, and the latter occupy about half the length of the entire foot. The *os calcis* extends one-third of the distance from the foot to the tip of the tail, which has its extreme tip free.

The face is furnished with some tufts and lines of bristly hair. Immediately in front of the eye may be noticed a tuft, consisting of a few hairs, and on the gland of the upper lip is a similar one. From behind the nostril proceeds a narrow band of fine bristly hairs,

which curves downwards and backwards on the lip for a short distance, and then taking an upward curvature, passes in front of the eye, and is lost in the fur of the forehead.

All the membranes, both above and below, have those parts contiguous to the body, hairy, especially the interfemoral, on which it extends more markedly than elsewhere. The part of the latter membrane which is destitute of hair, is smooth, and has about ten transverse strongly dotted lines.

Over the whole of the body the fur is very thick, soft, and rather long. On the top of the head it is long enough to obscure the basal half of the ears, and thus give the appearance of an elevated crown.

Everywhere the hair is unicoloured, and of a black-brown colour on the head and back, passing into chestnut-brown on the rump. Beneath it is similar in colour, but more strongly tinged with brown, especially towards the pubal region, where it is reddish-brown.

On examining the cranium, I find that its chief peculiarity consists in its extreme shortness in relation to its other dimensions. In this respect it more nearly resembles the cranium of *Lasiurus noveboracensis* than that of any other species of bat I have yet seen, but it is even shorter than in that species. In its general conformation it bears considerable resemblance to that of the common *Pipistrelle* of Europe, especially in the degree of elevation of the cerebral region; but the arrangement of the dental series is more like that of the *Noctule Bat* than that of the *Pipistrelle*, but bears a still greater resemblance to that of the *Scotophilus Gouldii* of Australia. Thus, on examining the teeth of the upper jaw, they are seen to be arranged in two *straight* lines which are nearly parallel, the incisors only deviating from these lines, being placed across the front of the space enclosed by them. This enclosed space—constituting the anterior part of the palate—is nearly a parallelogram, being but slightly narrower in front than posteriorly. Its length to its breadth is as one and a quarter to one.

The range of the teeth in the lower jaw must, of course, bear exact relation to that of the upper*, varying only in the number of the teeth and their individual form.

* It will not be out of place here to remark, that this expression applies exclusively to the normal state of dentition of animals in a state of nature. The reverse of this may occasionally be seen in accidental varieties or malformations, and frequently in domesticated animals, where a great change in the form of the jaws and teeth has often resulted from long-continued selection of individuals from which to produce a breed for some special purpose, which selection may have been further assisted by a constant training to the purpose for which the breed was designed. This must certainly be the case with some of the varieties of dogs. In the bull-dog, for instance, we find a most remarkable development of lower jaw, attended with an equally distorted arrangement of the teeth. It is scarcely necessary to allude to the singular appearance often observable in the front teeth of the human species, under- or over-lapping each other, as the case may be, and displaying every degree of intermediate arrangement. But these deviations from the normal state of dentition in no way affect the statement above made respecting the relation of the inferior to the superior maxilla, and their implanted teeth.

The number of the teeth is as follows :—

In. $\frac{2-2}{6}$; Can. $\frac{1-1}{1-1}$; Pre. Mol. $\frac{1-1}{2-2}$; Mol. $\frac{3-3}{3-3} = \frac{14}{18}$.

The upper incisors are arranged in pairs, of which the inner one of each pair is much larger than the outer one. They are all somewhat elongated, conical, and pointed, and when viewed in front are seen to have their points directed inwards, but when seen laterally have nearly a vertical direction, similar in this respect to the canines. A considerable interval separates them on each side from the latter teeth, and this, with their regular conical outline and nearly vertical position, constitute their chief peculiarities. In the centre, between the inner ones, is a considerable opening, caused by the non-development of the anterior margins of the intermaxillary bones, and the notch in the front of the palate, just as in the *Noctule Bat* and most other true *Vespertilionidæ*. The other teeth in the upper jaw present no deviations from what is usual in the genus.

In the lower jaw the incisors are of the form ordinarily observed in this genus ; they are symmetrically arranged and trilobed. The canines present no marked peculiarities of form. The premolars are small, pointed, and have their basal cusps less developed than those of the corresponding teeth in the *Noctule Bat*. The first of these teeth is much the smaller of the two. The molars differ in no respect from those of the above-mentioned species, excepting that their cusps are perhaps somewhat longer and more pointed.

In the following Table of dimensions, the first column represents the measurements of the specimen in spirit in the Museum of the College of Surgeons, before alluded to, and the other columns have been taken from specimens in skin in the British Museum :—

	No. 1.	No. 2.	No. 3.	No. 4.
	" "	" "	" "	" "
Length of the head and body..	2 1			
— of the tail	1 7	1 6		
— of the head.....	0 7 $\frac{1}{2}$			
— of the ears	0 3 $\frac{1}{2}$			
— of the tragus	0 1 $\frac{3}{4}$			
— of the fore-arm	1 6	1 6	1 6	1 6
— of the longest finger ..	2 8	2 10	2 8	2 7
— of the fourth finger ..	1 10	1 10	2 0	2 0
— of the thumb	0 2 $\frac{1}{2}$	0 3 $\frac{1}{4}$	0 3 $\frac{1}{2}$	0 3 $\frac{1}{2}$
— of the foot and claws..	0 3 $\frac{3}{4}$	0 4	0 4	0 4 $\frac{1}{2}$
Expanse of wings	10 9	10 4		

The foregoing description had been taken with a view to its publication, before that of Forster had been examined, the impression at that time being that the species was new.

For the convenience of immediate comparison, and to show the general similarity of the two descriptions, a condensed description will now be given of that furnished by Forster.

About the size of *Vesp. communis*, or a little larger ; the head like that of a mouse, and of medium size ; snout blunt, emarginate,

simple, with bi-tuberculated nostrils. The lower jaw rather shorter than the upper.

Incisors in the upper jaw 4, in pairs, of which the two inner ones are the larger; the two outer ones smaller, and approximate to them. In the lower jaw 6, very small and approximate. *Laniar*es (?) $\frac{1-1}{3-3}$; molars $\frac{4-4}{4-4}$.

Ears moderate, smooth, subovate; tragus semiorbicular. Wings large and dark brown. The fur everywhere soft, fine, and rusty brown.

Length from the end of the nose to the root of the tail.....	2 inches.
Length of the tail	$1\frac{3}{10}$ "
Expanse of wings	$10\frac{1}{2}$ "

Fam. NOCTILIONINA.

Genus MYSTACINA, Gray.

Body very short and broad. Snout much produced; nostrils sublateral, surrounded by a thickened projecting rim. Under jaw much shorter than the end of the nose. Top of the head considerably elevated; ears lateral, simple; tragus long, narrow, and pointed. Wings moderate; thumb moderate. Index finger with two phalanges, second finger with *four*, third and fourth fingers with three, each. Wing-membranes extending to the distal extremity of the tibia. Legs and feet short and stout. Tail very short, piercing the interfemoral membrane near to its base, and projecting on the upper surface of it, as in *Tuphous*. Interbrachial membrane, a narrow piece of membrane beneath the fore-arm, that adjoining the sides of the body, and that enclosing the tibia, as well as the basal portion of the interfemoral membrane, thick and leathery, with numerous deep wrinkles or corrugations on its upper surface. Incisors, two in the upper jaw, large, contiguous, and shaped like canines; in the lower jaw two, small, and placed in front of the canines.

1. MYSTACINA TUBERCULATA, Gray. (Pl. LIV.)

Mystacina tuberculata, Gray, Cat. Mam. Brit. Mus. p. 34, 1843; Gray in Deffenb. Journ. App. p. 296, 1843; Gray, Zool. Voy. Sulphur, No. II. p. 23, 1843; Zool. Voy. Erebus and Terror, No. IV. pl. 22. 1844.

The snout of this singular-looking species is considerably elongate d with the end of the nose emarginate between the nostrils, which are very prominent, and directed sublaterally. The mouth is placed far back in relation to the nose, and a space intervenes between the two, which is clothed with very fine short hairs. The hairiness and form of this space are somewhat similar to the same part in the *Coati Mondi*. No very strongly-marked peculiarity is observable in the mouth itself, but it is rather small, and has only the extreme edges of the lips destitute of hair.

The top of the head is convex, rounding off on every side, and the space between it and the end of the nose, *i. e.* the face, is concave in its longitudinal direction, but not transversely, as in *Taphozous*.

The ears are lateral, and remarkably simple in form. Instead of the forward extension on the side of the face, so usual in the insectivorous species of this order, they are attached precisely as in the fruit-eating species, *i. e.* just as we may observe them in a *dog* or *cat*. In form they are regularly oval, and slightly pointed. The tragus is straight, narrow, and pointed, reaching to the middle of the ear.

The wings are rather broad, and of medium length. The thumb is of moderate size, with the basal joint very short; the index finger is composed of two phalanges, the terminal one being very minute. The second finger has *four* phalanges, and the third and fourth fingers have three each. The presence of four phalanges in the second finger, instead of the usual number of three, in this family, will be again adverted to. The wing-membranes barely extend to the distal extremity of the tibia.

The legs and feet are very short and stout, as in the genus *Molossus*. The heel-cartilage is of medium length and substance, and the interfemoral membrane is rounded at its posterior margin, and is perforated near its base by the tail, which is short, and exhibits its terminal half free above the membrane, as in the genus *Taphozous*.

The portions of membrane contiguous to the fore-arm, the sides of the body and the tibia, are very thick and leathery, with numerous deep wrinkles, and the basal half of the interfemoral membrane (as far as to where the tail becomes free) possesses the same peculiarity. The wrinkles, in many places, cross the legs and fore-arms, but they are only observable on the *upper* surfaces of the membranes and limbs. This singular part of the cutaneous system is marked by a regular and decided outline, and can scarcely be said at any place to graduate into the smooth membrane of the wings. Its extent is pretty well indicated by the hairy portions of the membranes in the genus *Lasiurus*, excepting that it only occupies one-half of the interfemoral membrane.

In its general character, the fur is short, crisp and thick, having a grizzly shining appearance, very similar to that of some of the *Soricidae*. That of the head extends towards the nose, and covers the whole of the face, being bounded anteriorly by a frill of stiff upright hairs; that commencing near the corner of the mouth extends upwards in front of the eye, and meets on the top of the nose with the corresponding part of the other side of the face. On all the upper parts of the body the fur is similar. It is dusky at its base, and tipped for half its length with shining grey-brown, having a slight tinge of olive. Beneath, the fur is brown at its base, with shining tips of grey-brown. The fur of the throat extends to the chin and under lip, and densely covers the whole, excepting the extreme edge of the lip.

The whole of the cutaneous system is very dark-brown, with the exception of the wrinkled part already mentioned, which is paler, and tinged with yellowish.

The cranium exhibits some peculiarities worthy of note. Viewed from above, the cerebral portion is seen to be about as much arched as that of *Vesp. Nattereri*, and has a faint sagittal crest towards the occipital region. Also there is a moderately pronounced occipital crest, which becomes more strongly developed in the vicinity of the acoustic elements of the skull. The auditory bullæ have much the same form and proportion as the same parts in *Vesp. Nattereri*, and the facial portion of the skull is proportioned much as in that species. The orbital openings are of very moderate size, and the zygoma but little arched, and very slender. The bony palate terminates a little posteriorly to the last molar. The nasal opening is small, and the intermaxillary bones meet in front, for the support of the contiguous incisors, as in *Miniopteris* and *Furipterus* among the *Vespertilionina*, and *Molossus*, *Rhinopoma*, and *Noctilio* among the *Noctilionina*.

The incisors in the upper jaw are two in number, large, conical, and pointed. They are provided with a distinct *cingulum*, visible in front, which passes into a well-marked basal lobe, or cusp, behind the tooth. As the incisors are situated very near to the canines, and are themselves in contact, this lobe is only visible when seen directly from behind. The incisive foramina are two in number and very minute. The canines are long, pointed, and triangular, without any basal lobe. The next two teeth in the upper jaw present the same forms which usually characterize the premolars in the insectivorous *Cheiroptera*; and the three remaining teeth, *i. e.* the molars, may be similarly passed over.

The hinder part of the lower jaw is formed very similarly to the same part in the genus *Vespertilio*, but has the *posterior process* less produced. Another point of difference occurs in the form of a somewhat rounded *posterior angle*, something like that observable in *Furipterus*, but more nearly resembling the same part in the jaw of the *Ursus labiatus*, and, as in the latter instance, very thin in substance laterally. The jaw itself is straight, especially the alveolar margin, which is in a line continuous with the *posterior process*.

The canines in the lower jaw are of considerable size, and have a basal lobe behind. They are nearly contiguous, and the incisors, two in number, are placed in front of them as in some species of the genus *Molossus* (*Nyctinomus*), and, as in that genus, are probably lost with age. They are very small, feebly implanted in the jaw, and have their tips trilobed. The next two teeth are of the usual premolar type, such as we find in *Vespertilio* proper, and they are succeeded by the three molars, presenting no marked peculiarities of conformation.

Dentition :—In. $\frac{2}{2}$; Can. $\frac{1-1}{1-1}$; Pre. Mol. $\frac{2-2}{2-2}$; Mol. $\frac{3-3}{3-3} = \frac{14}{14}$.

In the following Table of dimensions, column number 1 has been taken from a large and probably adult specimen in the British Museum, and numbers 2 and 3 from specimens, perhaps not quite adult, in my own collection. The latter one, having all the bones retained, would furnish the more exact dimensions, but that it is probably immature. From it the skull was extracted, from which the above characters have been taken :—

	No. 1.		No. 2.		No. 3.	
Length of the head and body	"	"	"	"	"	"
— of the enclosed part of the tail. .	0	3	0	3	0	3
— of the free part of the tail	0	3	0	3	0	2 $\frac{1}{4}$
— of the head	1	0 $\frac{1}{2}$	0	11 $\frac{1}{2}$	0	11
— of the fore-arm.....	1	9 $\frac{1}{2}$	1	7	1	8
— of the longest finger.....	3	0	2	11	2	11 $\frac{1}{2}$
— of the fourth finger.....	2	6	2	4	2	4
— of the thumb	0	5	0	4 $\frac{1}{2}$	0	4
— of the tibia	0	8	0	7	0	7
— of the foot and claws	0	7 $\frac{1}{2}$	0	6	0	6
Expanse of wings	12	0	11	10	11	6

The following are the dimensions of the skull extracted from the specimen which has supplied the measurements given in the second column of the above Table :—

Length from the occipital crest to the anterior of the maxil- lary bones	"	"
Breadth across the zygomatic arches	0	9 $\frac{1}{4}$
Length of the nasal bones	0	3
Greatest breadth of the nasal bones	0	1 $\frac{1}{4}$
Length of the dentinal series in the upper jaw	0	4
Breadth between the two outer cusps of the two posterior molars	0	3 $\frac{1}{2}$
Breadth between the points of the two upper canines	0	1 $\frac{1}{2}$
Total length of the lower jaw.....	0	6 $\frac{1}{2}$
Length of the dentinal series in the lower jaw	0	4
Breadth between the outer cusps of the two posterior molars	0	2 $\frac{3}{4}$
Breadth between the points of the lower canines	0	1

In summing up the characters of this singular species (as far as is known, the sole representative of the genus), several affinities not usually associated are manifest. Thus in the form of the tail, and the way in which it perforates the interfemoral membrane, it bears strong resemblance to the genus *Taphozous*, whilst the strength and form of the hinder limbs, but more especially the form and implantation of the canine and incisor teeth, would seem to indicate an affinity with the genus *Molossus* (*Nyctinomus*), both of these genera being representatives of the family *Noctilionina*. Again, on examining attentively the forms of the ear and tragus, we shall be struck with the great resemblance which the latter bears to that of some of the examples of the genus *Vespertilio*, and the former, although differing considerably from the ear in *Vespertilio*, bears nevertheless a greater resemblance to it than perhaps to that of any other genus. But there is another peculiarity to which I have already alluded, which is deserving of especial notice—the presence of *four* bony phalanges in the second finger—a peculiarity in which it resembles the *Phyllostomidae* or Leaf-nosed Bats of the New World, that number being one of their characteristics; whilst in all the Old World genera,

with the exception of the one now under notice, we find that that finger has only *three* bony phalanges*. There are, however, several characters present which appear to belong exclusively to the present genus, such as the form of the snout and nostrils, the singular markings on some of the membranes, and the peculiar quality of the fur.

EXPLANATION OF PLATE LIV.

Fig. 1. *Mystacina tuberculata*, three-fourths of the natural size.

a. Head of the same, of the natural size.

b & c. Cranium of the same, of the natural size.

d. Magnified representation of the front teeth of the same.

Fig. 2. Magnified representation of the front teeth of *Nyctinomus dilatatus*, showing the resemblance between them and the same parts in *Mystacina tuberculata*.

3. ON THE JAMAICAN CYCLOTUS, AND THE DESCRIPTION OF TWENTY-ONE PROPOSED NEW SPECIES AND EIGHT NEW VARIETIES OF THAT SUBGENUS FROM JAMAICA BY THE HON. EDWARD CHITTY.

Before entering upon the task of description, it seems advisable to offer a few observations upon the difficulty which has hitherto surrounded this group of *Cyclostomidae* inhabiting Jamaica.

The late Professor C. B. Adams, in *Contr. to Conch.*, No. 8, p. 140, *et seq.* wrote an article upon it; and although the required study enabled him to add seven new species to the former Jamaican list, a perusal of his paper will show that he laboured under great doubts and without clear satisfaction as to the result. The fact is, that almost all the species in the *Jam. Cat.* of Adams†, 1851, from No. 68 (for *C. Duffianus*, No. 67, is not a Jamaican, but a South American species—*sic* Adams and Mr. Bland, who found duplicates in South America), to No. 77 inclusive, run so much into one another in outward form of the mere shells, *wanting the opercula*, that it is next to impossible to classify them. There is also the difficulty of young and old shells intermingled, which, as regards some of the species, renders the "confusion worse confounded," particularly in the young of *C. Jamaicensis*, and the more mature of *C. crassus*.

The group in question, and many others, lead me to the firm conviction that, unless the differences are very marked, a single specimen

* A similar peculiarity occurs in the genus *Centurio*, which, when first described by Dr. Gray, was thought to be a native of the Old World, but there was some doubt as to the exact locality from which it had been received. But other examples have been since obtained from the New World, and its near alliance with the tailless *Phyllostomidae* satisfactorily established. The existence therefore of *four* phalanges in this finger in *Centurio* cannot be considered, as in *Mystacina*, as an exception to a general rule, but on the contrary as a further extension of it.

† Whenever the name "Adams" is mentioned in these communications, the late Professor C. B. Adams, of Amherst College, America, is referred to, unless otherwise specified.

is not to be trusted; and that it is only by a multitude of specimens, perfect as regards maturity and possession of opercula, that truth can be arrived at, and species determined.

The difficulty with Adams, as with myself, has hitherto been the want of the original types of the fundamental shells, so to speak. I allude especially to the types of *C. corrugatus*, Sow.; *C. subrugosus*, Sow.; *C. Jamaicensis*, Chemn.; and *C. asperulus*, Sow. [Of *C. suturalis* there never was a doubt.] That difficulty is evidenced by his note of interrogation "?" at p. 143, (*id.*) after "1 *C. corrugatus*," and his description of "No. 1, *C. corrugatus*" below, which most clearly refers to a species, which to my certain knowledge he has distributed indiscriminately as *C. corrugatus* and *C. jugosus*. So he made up the collection which some time ago I presented to the British Museum. I know that the presence or absence of the umbilical keel was a guide he was always looking for. He did not seem to understand Sowerby's description "umbilico magno, crenulato, intus transversim striato." *Vid.* Cont. Conch., p. 143. And beyond a doubt, his description of the operculum of *C. corrugatus* at p. 143, *id.* cannot for a moment be reconciled with Pfeiffer's in Cat. Phaneropneumona, p. 13.

Mr. Cuming's liberality in lending his choicest specimens for science's sake is too well known to require my commendation. To him I am now indebted for the loan of his types of *C. corrugatus*, *C. jugosus*, *C. subrugosus*, *C. Jamaicensis*, *C. seminudus*, *C. varians*, *C. crassus*, and *C. asperulus*, all of which have passed through Pfeiffer's hands: and I have examined those in the British Museum.

C. asperulus is not in my collection, though amongst those I am about to propose as new species, some approach very near to it. The two specimens (one with part of the operculum) in the Cumingian Museum, and those in the British Museum are somewhat like in character to Jamaica shells, especially *C. crassus*, in regard to absence of umbilical keel, and *C. rudis-planusque* (after mentioned) as regards operculum; and I do not wish to cast a doubt as to its habitat being Jamaica, though I have not fallen in with it.

Pfeiffer, in Cat. Phan. p. 13, has indicated that *C. corrugatus* was in the British Museum when he wrote; but unfortunately the specimens there under that name vary so much in their opercula, that it is impossible to say to which he referred. In fact, his description is believed to have been taken from one in the Cumingian Museum. But there again, equal doubts and uncertainty exist. Some shells, all named by Pfeiffer, having opercula of the character of those of *C. Jamaicensis*, are marked "*C. corrugatus*," and others are similarly marked with the addition of "var.," the opercula of which answer his description in Cat. Phan., p. 13, and have the precise character of that which it is my intention to adopt as the true *C. corrugatus*, those characters being totally dissimilar. Thence an interminable confusion exists, which it is very difficult to disentangle.

It seems to me that Sowerby and Pfeiffer have had only single specimens to deal with, and not knowing how many forms of opercula there are, have certainly not been very minute in their descrip-

tions, and have not perhaps set sufficient value on those differences, which they had an opportunity of observing; while Adams saw great differences, but from the want of *many* specimens feared to give specific importance to them.

I should not have adopted the independent course of disregarding previous naming or descriptions, nor attempt to propose new species, had I possessed a few specimens of each only. But having of almost every species plenty of perfect specimens, and having them so arranged that I know the precise habitat of almost all, I feel there is abundant justification for my proceeding. Sowerby's description of the operculum of *C. corrugatus* is (doubtless from causes before alluded to) so very meagre, that it is utterly impossible to say to what shell he referred. Pfeiffer, Gray, and Adams have all been misled: for every Jamaican *Cyclotus* has its operculum "*extus laminâ elevatâ*." But it will be found that the description which I shall give of the operculum of *C. corrugatus*, does not militate with, but only enlarges upon Pfeiffer's, which is "with whorls, the margin of which is dilated into broad, spiral, raised, somewhat expanded lamina." While the shells which Adams has distributed, (and at p. 143, Cont. Conch. has described with a "?") as *C. corrugatus*, and which Gray has marked "*C. corrugatus* var." in the British Museum, militate very strongly with Pfeiffer's description, and also exactly agree with the opercular type of *C. jugosus*, which type is so peculiar that it can hardly be supposed that Sowerby would not have especially noted it.

Aided by what now appear marked differences in other parts of the shells, my principal guide to the new species I am about to propose has been the *Operculum*. I am aware that some have to a certain degree discarded the operculum as a specific test: yet a careful examination of my Jamaican *Cyclotus*,—the careful gathering together, all from one extensive and rich field,—will tend to the conviction that such a repudiation is not correct. We find the forms of opercula constant in all other subgenera and species of *Cyclostomidae*, with equal certainty in shape and sculpture; and by more than analogy the opercula of the Jamaican *Cyclotus*, accompanied by differences in other parts of the shell, are specific guides and of specific importance.

I propose for consideration that there are *six distinct forms of opercula* in the Jamaican *Cyclotus*.

FORM § I. *that of C. corrugatus, Sow.*

Sowerby, in Pro. Z. S., 1843, p. 30, describes the operculum of it as "*testaceo, extus laminâ elevatâ, convolutâ; intus corneo, polito*," testaceous with elevated convolute lamina outside (or on the upper side), and horny and polished on the under side.

Pfeiffer, in Cat. Phan. p. 13, describes it as "with whorls, the margin of which is dilated into broad, spiral, raised, somewhat expanded lamina."

I should describe the *typical* form of the operculum of that which I adopt as *C. corrugatus*, "with lamina rising more or less, and well separated from the plane of the operculum, bending outwards;

the upper margin, more or less dilated and reflected, so as to lie more or less parallel to the plane of the operculum, but not so much as to touch each consecutive whorl. Plane of operculum plain."

FORM § II. *that of C. varians, Ad.*

Operculum with outward-spreading whorls raised from its plane, the upper margins of which are thickened and inflected, and reflected, so as to meet and touch each consecutive whorl; and form a corrugated, almost entire, planular surface; and when broken in half, forming on either side something like a number of italic capitals, *XX TT*, or the rails of a railway. Where concave on the outer surface, the concavity is formed by the increasing height of the lamina, the under side (as far as I have seen) being always planular.

FORM § III. *that of C. seminudus, Ad.*

Operculum with slightly elevated, bluntly thickened, and broadly expanding whorls, the edges of which are wholly appressed to, and not separated from the plane.

FORM § IV. *that of C. Jamaicensis, Chitt.*

Operculum with moderately raised narrow lamellar whorls, which are flattened and blunt at the margin, and very slightly and narrowly expanded and reflected outwards; the plane of the operculum always excentrically and sharply striated by lesser raised laminae.

FORM § V. *that of C. Rupis-Fontis, Chitty.*

Operculum with well-raised whorls, which are sharpened at the margin, and stand almost vertical with the plane, the margin being neither reflected nor inflected.

FORM § VI. *that of C. jugosus, Ad.*

Operculum with highly raised whorls, the margins of which are sharp, and more or less inflected, convex interiorly and concave exteriorly.

These differences are broad enough whereon to found sub-subgenera, but from that I abstain.

Under FORM § I. I place my *C. corrugatus* and var. *a*, *C. Portlandensis*, *C. notatior*, and var. *a*, *C. notatus*, *C. Novæ-Spei*, *C. cycloatus*, *C. dubiosus*, and *C. suturalis*.

Under FORM § II. *C. varians* and var. *a*, *C. subrugosus*, *C. corrugator*, and var. *magna*, *C. gemma*, and *C. zigzag*.

Under FORM § III. *C. seminudus*, *C. De Burghæanus*, *C. rudis-planusque*, *C. pretiosus*, *C. Bairdianus*, *C. ruber*, and *C. asperulus*.

Under FORM § IV. *C. Jamaicensis*, *C. Novus-Saltus*, *C. dentistigmatus*, *C. crassus*, and *C. inutilis*.

Under FORM § V. *C. Rupis-Fontis*, and *C. corrugatissimus*.

Under FORM § VI. *C. jugosus*, and vars. *rufilabris*, *parvus* and *striatus*, *C. pallescens*, *C. Westmorlandensis*, *C. nodosus*, and *C. Beswicki*.

N. B. Of *C. perpallidus*, the operculum is still unknown.

I do not place much value on the outward form, sculpture, and size of these *Cyclotus*, and, wanting the opercula, regard the classification of them as very difficult; I will, however, proceed to the more particular description of each species and variety as I find them in my own private cabinet, taking them in the order already mentioned.

§ I.

C. CORRUGATUS, Sow. Proc. Z. S. 1843, pp. 29, 30.

Sowerby's entire description is, "*C. testâ orbiculatâ, subdepressâ, crassiusculâ, albidâ, apice rufescente; epidermide tenui, fuscâ, indutâ; spirulâ subprominulâ, acuminatusculâ; anfractibus quinque, rotundatis, transversim striatis et corrugatis; suturâ distinctâ, aperturâ circulari, subeffusâ, supernè angulatâ et in canalem inconspicuam desinente; peritremate tenuiusculo, margine acutiusculo, latere umbilicali incrassato; umbilico magno, margine crenulato, intus transversim striato. Operculo testaceo, extûs laminâ elevatâ, convolutâ, intûs corneo, polito.*"

C. CORRUGATUS, Pfr. Cat. Phan. p. 13.

Shell subturbinate-depressed, solid, regularly all over angularly wrinkled, white, with a deciduous fulvid epidermis; *spire* short, reddish, rather acuminate; *whorls* 5, convex, the last one cylindrical, nearly flat beneath, with a nodulous ridge around the umbilicus, which is open, and of a middle size; *aperture* a little oblique, nearly circular, with a slight angle above, inside whitish; *peristome* straight, blunt; its margins joined into an angle, which often is doubled; right margin slightly sinuate; left margin shortly affixed to the penult whorl. *Operculum* concave externally, with 9 very narrow whorls, the margin of which is dilated into broad, spiral, raised, somewhat expanded laminæ. Height 14, greatest breadth 22, least breadth 19 mill.—Cat. Phan. p. 13.

C. CORRUGATUS, Chitty.

The shell I adopt as *C. corrugatus* I describe as "depressed-turbinate: colour blueish-white, with an epidermis of rich red-brown and yellowish-brown; just below the suture and apex, rich red-brown; salmon-colour tinge within the aperture. *Sculpture*, the $3\frac{3}{4}$ upper whorls, excepting the nuclear apex, with the lines of growth strongly but finely defined, without wrinkles. Thence the lines of growth become coarser and coarser throughout the remainder; coarser and coarser wrinkles diagonally from right above to left below on the penult whorl, the wrinkles gradually assuming a zigzag form, till they become very coarse at the periphery of the last whorl, and then eccentric curvilinear grooves which terminate and are deepest, but are not tooth-marked at the umbilical keel, which is well raised, the terminating fourth part of the last whorl becoming comparatively smooth. *Spire*, moderately elevated, with convex outlines. *Whorls*, $5\frac{1}{4}$, moderately rounded, rather flattened above, and spreading below, with moderate suture; the terminal half of the last

whorl much depressed above, at, and behind the aperture. *Aperture*, rather oblique in incomplete shells, subelliptical and subangular above, like a hanging pear—in finished shells, subcircular, rather dilated below on the right side, and the angularity above becoming almost obsolete by the thickening of the outside. *Peritreme*, well thickened and blunt all round. *Umbilicus*, deep and comparatively narrow; greatest breadth, that is from side to side at the *umbilical keel**, about 0.36, and least breadth 0.28. *Umbilical keel*, narrowly and roundly pinched up, the striae of growth extending over it imbricatedly from the hollow. *Operculum*, greatest breadth 0.51, least breadth 0.46—slightly concave externally, with about † 9 outward bending, spiral whorls of laminae rising from its plane, the summits of which spread, and are reflected outwards, but widely separated from one another, nearly parallel to the plane, and striated eccentrically, as like water flying off a turned wheel by centrifugal force; lamina well detached above from the plane, and from each other whorl. Height of shell, 1 inch; greatest breadth 1.2, least breadth 1 inch ‡.

C. CORRUGATUS, var. *a* (?), Chitty.

This shell differs from *C. corrugatus* in being much smaller. Height 0.8, greatest breadth 0.94, least breadth 0.75; greatest breadth of *umbilicus* 0.27, least breadth 0.2; greatest breadth of *operculum* 0.43, least breadth 0.37. The corrugation is finer. It is sometimes *quasi* smooth below, and marked with bands like *C. Jamaicensis* with transverse raised sub-obsolete lines. *Umbilical keel* is less prominent.

Whorls 5. Whorls of operculum about 6 or 7.

C. PORTLANDENSIS, Chitty. Portland.

Form, depressed-turbinate. *Colour*, blueish-white with a deep bistre brown epidermis; apex blood-red sometimes. *Sculpture*, $3\frac{1}{3}$ of upper whorls coarse, striae of growth becoming thenceforth deeply corrugated vertically on the upper part of the last whorl until about the last third, where the corrugation ceases; the striae of growth are finer and a few pits occur, and a few transverse obsolete ridges appear. No corrugation at the periphery: a few pits, and a slight corrugation surround the outside of the umbilical keel. Umbilical keel and striae of growth within the umbilicus are much stronger than in *C. corrugatus*. *Spire*, and outlines like *C. corrugatus*. *Whorls*, $5\frac{1}{3}$, last whorl and about $\frac{1}{4}$ th of penult whorl depressed above, below the suture. *Aperture*, like *C. corrugatus*, but rather more expanded on right than on left side; oblique to axis, as *C. corrugatus*. *Peritreme*, like *C. corrugatus*. *Umbilicus*, much wider in

* The measurement of the *umbilicus* in all instances is taken from side to side from the inner edge of the *umbilical keel*, taking care that the *points* of the compasses shall be at a right angle with the axis of the shell.

† The nuclear centre and second whorl are probably never seen in mature shells, from their extreme delicacy while young, which causes the appearance of being devoid of laminae in the extreme centre.

‡ All my measurements are in decimals of an inch.

proportion than *C. corrugatus*: greatest breadth 0·32, least breadth 0·26. *Operculum*, of general character of that of *C. corrugatus*: greatest breadth 0·45, least breadth 0·41; whorls, about 10, much closer approaching each other than in *C. corrugatus*, and spread of margin much less; slightly concave. Height 0·85, greatest breadth 1·07, least breadth 0·88.

C. NOTATOR. Chitty. St. Elizabeth.

Form, colour, and sculpture much like *C. corrugatus*, finer in proportion. *Whorls* 5, a slight depression only on upper part of last whorl. *Umbilical keel*, not so distinctly raised, but broader in proportion: greatest breadth 0·25, least breadth 0·2. *Operculum*, of *C. corrugatus* character, slightly concave: raised lamina of 8 whorls, the margin scarcely reflected. Height 0·59, greatest breadth 0·8, least breadth 0·61.

C. NOTATOR, var. *a*, Chitty. Yallahs Hill.

Is much smaller and finer in sculpture, and the umbilical keel is much less prominent in proportion. Height 0·46, greatest breadth 0·61, least breadth 0·53.

C. NOTATUS, Chitty. Trelawny.

Sculpture, fine and almost smooth, with a slight corrugation on the upper part of latter half of the last whorl, which is devoid of depression in its upper part. *Umbilicus*, greatest breadth 0·17, least breadth 0·16. *Umbilical keel*, almost obsolete. *Operculum*, character of *C. corrugatus*, more concave than preceding; spiral lamina, about 8 whorls, upper margin scarcely reflected. Height 0·58, greatest breadth 0·64, least breadth 0·56.

C. NOVÆ-SPEI, Chitty. New Hope, Westmoreland.

This shell is very much corrugated on the last and a quarter of the penult whorls, and eccentrically and very deeply round the umbilical keel; from all others of its size it may be distinguished, even in worn shells, by the appearance of pits or indentations on its exterior, as though the keel (which is very prominent) had been bitten into its shape by pointed distant teeth. *Umbilicus*, greatest breadth 0·24, least breadth 0·18. *Operculum*, character of *C. corrugatus*; lamina 8 or 9 whorls, margin rather more broadly expanded and flattened than in *C. notatus*, slightly concave. Height 0·63, greatest breadth 0·82, least breadth 0·71.

C. CYCLOATUS, Chitty. New Hope.

Form, as usual. *Colour*, a broad band of rich brown-red extending round above and below the periphery, whence its name—and above and below, light dingy yellow. *Sculpture*, fine striæ of growth on upper three whorls, the remainder much coarser, corrugated below the suture, and below that, pitted; smooth and shining at the periphery; much pitted outside the umbilical keel, coarse lines of growth inside umbilicus. *Spire*, much depressed. *Whorls*, 4 $\frac{2}{3}$ rds, well

rounded with deep suture. *Aperture*, subcircular, angular (as usual) above. *Peritreme*, slightly indented above. *Umbilicus*, large, greatest breadth 0·27, least breadth 0·24. *Umbilical keel*, much raised on the inside, and moderately so on the outside. *Operculum*, more concave than the preceding; sculpture partakes of that of *C. corrugatus* and of *C. Jamaicensis*, the spiral lamina bending outwards, and its margin slightly reflected horizontally, as in the former, and the plane being strongly striated, as in the latter; 7, or perhaps, 9 whorls, convex on under side. Height 0·61, greatest breadth 0·88, least breadth 0·72.

C. DUBIOSUS, Ad., and *C. SUTURALIS*, Sow. See Cat. Phan. p. 12.

Habitat of *C. dubiosus* is north of "Holland Estate," near the "Ys" river. It is very scarce; and I never could obtain more than one small lot, of about nine or ten specimens, many not fresh; and only one with the operculum, the spiral lamina of which is very like in all respects to that of *C. suturalis* (see *id.*, p. 12); but has at least 7 whorls; these in both shells bend outwards, like to my type of *C. corrugatus*, with margins well reflected outwards, but scarcely horizontally, though more so in *C. dubiosus* than in *C. suturalis*; the under side of operculum is flat. *C. suturalis* is found in the higher mountains which run from Manchester, as far as New Hope, Westmoreland, in the west end of the island; but not, I think, near the spot where the former is found, though passing it.

§ II.

C. VARIANS, Ad. See Cat. Phan., p. 15, and *ante*, p. 145, as to formation of lamina on operculum. *Operculum*, planulate on the under side. Height 0·72, greatest breadth 0·9, least breadth 0·72.

C. VARIANS, var. *a.*, Chitty.

Is of a darker colour; the *operculum* is slightly more concave; the last part of the last whorl is nearly smooth, devoid of sculpture; the *umbilical keel* is not so wide, and the shell is much less depressed in proportion to its breadth. Height 0·72, greatest breadth 0·86, least breadth 0·67.

C. SUBRUGOSUS, Sow. See Cat. Phan., p. 15.

The description of operculum, wanting there, I am able to supply; Class *varians*, more planular, with 9 or 10, or perhaps more whorls of the spiral lamina; planulate below.

C. CORRUGATOR, Chitty. Gutter's Hill.

Form, much depressed-turbinate. *Colour*, light red-brown, inclined to pink, with a light brown epidermis. *Sculpture*, fine striae of growth on the 1st and 2nd whorls, except on the nuclear apex; from about the completion of the 2nd whorl, the diagonal (from right above to left below) corrugation becomes very strongly and regularly defined, terminating, in regularity,

at about one half of the last whorl, where the corrugation becomes coarse, irregular, and ill-defined, till little more than coarse striæ of growth are seen behind the aperture. From the periphery downwards, the corrugations on the last whorl, for about its first half, are much closer together than those above, and lie almost horizontally, but inclining from left above to right below; and, outside the umbilical keel, the rest of the whorl below the periphery is much pitted. Striæ of growth inside the umbilicus rather fine. *Spire* much depressed, with convex outlines. *Whorls* nearly 5, well rounded with a deep suture. *Aperture* well rounded, slightly subangular above. *Peritreme* rather reflected, and spread on the right, sometimes double above; thickened (as is usual) on the left, and slightly detached from body-whorl. *Umbilicus* broad; greatest breadth, 0.35; least breadth, 0.31. *Umbilical keel* well developed. *Operculum* moderately concave above, planulate below, rather inclined to that of *C. corrugatus* form, from the cross lines on the margin of the spiral lamina being less developed, but otherwise like the *C. varians* type in general character of closeness to one another. 8 or 9 whorls, and still a vacuity in the centre. Height 0.7, greatest breadth 0.98, least breadth, 0.84.

Var. *minor*, Chitty, is much smaller; being, height 0.53, greatest breadth 0.8, least breadth 0.65.

Var. *magna*, Chitty, is much more conical; height 0.8, greatest breadth 0.92, least breadth 0.81.

C. GEMMA, Chitty. New Hope.

Form, very much depressed-turbinate. *Colour*, bluish-white, with a light brown epidermis. *Sculpture*, like to *C. corrugator*, but corrugation commences almost at the first quarter of the 3rd whorl; corrugation very marked in proportion to size, as in *C. corrugator*; sometimes in zigzag vertically, sometimes with diagonal arrow-head-shaped indentations, the points being on the periphery, on the last whorl. *Spire*, much depressed, with convex outlines. *Whorls*, $4\frac{1}{4}$, well rounded with a deep suture, last whorl much depressed. *Aperture*, widely expanded, especially on the right side and below, slightly angular above. *Peritreme*, well expanded on right side, more separated from body-whorl on left than in *C. corrugator*. *Umbilicus*, broad; greatest breadth, 0.21, least breadth, 0.16. *Umbilical keel*, almost obsolete. *Operculum*, same as in *C. corrugator*, with about 9 whorls. Height 0.41, greatest breadth 0.66, least breadth 0.51.

C. ZIGZAG, Chitty. Trelawny.

Form, depressed-turbinate. *Colour*, white, with light brown epidermis. *Sculpture*, like *C. corrugator* in the upper whorls, only very much finer and closer, and more regularly corrugated, in zigzag form, on the last whorl, and finely corrugated all over the under side, except behind the aperture, round the umbilicus. *Spire*, moderately elevated, with convex outlines. *Whorls*,

4 $\frac{1}{2}$, well rounded, with a deep suture at the upper whorls, and a moderate one above the last whorl. *Aperture*, subcircular, diam. 0.34, expanding rather on the umbilical than on the opposite side, slightly detached from the body-whorl; angular above. *Peritreme*, slightly sinuate. *Umbilicus*, narrow, greatest breadth 0.15, least breadth 0.13. *Umbilical keel*, well produced. *Operculum*, small (diameter 0.25) with spiral lamina of 9 whorls, and perhaps more; much more concave than in *C. varians*, and less so than *C. corrugator*; planulate beneath. Height 0.6, greatest breadth 0.75, least breadth 0.58.

§ III.

C. SEMINUDUS, Ad. See Ad. Contrib. Conch., pp. 143, 146; Cat. Phan., p. 15.

In order to carry out my views as to the specific value of the opercula, it is necessary I should enlarge upon Adams's description, which is as follows:—"Operculum quite concave, with the spiral lamella scarcely elevated, but much thickened and appressed on the exterior side." My description is;—Operculum concave on the upper side, and convex on the under side, with 5 or 6 distant whorls of spiral lamina, scarcely elevated, and much thickened; the margins spreading widely outwards horizontally into a surface covered by excentric lines, so as to join each succeeding whorl, and *apparently* not detached; closely appressed to the plane, though in reality (as seen on breaking the operculum in half) not soldered to it. This operculum, from its centre, represents the base of an amphitheatre, each whorl resembling very broad steps or seats rising towards the exterior; greatest diameter 0.34, least breadth 0.32. *Umbilicus*, greatest breadth 0.41, least breadth 0.34. *Habitat*, north-west border of Manchester, and Bogue estate, St. Elizabeth.

C. DE BURGHEANUS, Chitty. ? Westmoreland.

Form, globose-conic. *Colour*, bluish-white, with an epidermis, light brick-red, on the upper whorls, turning into a pale straw-colour for about $\frac{1}{4}$ th below the suture, on part of the penult, and on the last whorl, and rich red-brown over the remainder, which is sometimes interrupted by straw-coloured bands at the periphery and round the umbilical keel. *Sculpture*, lines of growth on $3\frac{1}{2}$ of the upper whorls, thence it becomes finely corrugated below the suture on the penult whorl, very coarsely so on the last whorl, sometimes extremely so, and knotted at the sinuation in the peritreme, all below being smooth and shining, except for the continuance of the lines of growth, a few distant blunted spiral lines, and a few pittings scattered below at the junction of the umbilical keel and aperture. Within the umbilicus, the lines of growth are very coarse. *Spire*, well elevated with convex outlines. *Whorls*, 5, well rounded with a well-impressed suture. *Aperture*, rather oblique, well expanded below. *Peritreme*, light-brown, more sinuate above than *C. seminudus*, and sometimes very

deeply sinuated; in age not so much thickened as in *C. seminudus*, but in one instance of a larger (than typical) old shell, very much produced from the body-whorl. *Umbilicus*, narrow; greatest breadth 0·3, least breadth 0·24. *Umbilical keel*, well developed, not very broad. *Operculum*, planular above, with a slightly elevated, broad, rounded lamina, of about 5 whorls far apart, and the last much farther from the outer edge of the operculum; the margins broadly reflected and expanded on the plane of the operculum and covered with sharp excentric striae; on the under side, the centre is elevated at the nucleus, then concave and broadly raised all round the edge; greatest breadth 0·43, least breadth 0·4. Height of shell 0·84, greatest breadth 0·99, least breadth 0·82. Named in compliment to Mrs. De Burgh.

I have reason to fear that I *may* have distributed this shell as *C. seminudus*. Let me here observe how excellent a guide is the operculum; but for the concavity of *C. seminudus* and the flatness of this, other differences might have escaped notice. How marked are the differences, however!

	Measurements of <i>C. seminudus</i> .	Measurements of <i>DeBurghæanus</i> .
Height of shell	0·65.....	0·84
Greatest breadth	1 inch	0·99
Least breadth	0·79.....	0·82
Greatest breadth of umbilicus..	0·41.....	0·3
Least breadth	0·34.....	0·24
Greatest breadth of operculum..	0·34.....	0·43
Least breadth	0·32	0·4

C. RUDIS-PLANUSQUE, Chitty. Accompong Town, St. Elizabeth.

This shell, likewise, Adams has distributed as a variety of *C. varians*, from which it most materially differs in its operculum. It is, however, a puzzling shell, as it varies so much in its dimensions, as seen below.

Form, globose-conic. *Colour*, dark brown; sometimes light red-brown; sometimes, in age, almost black on the last whorl; sometimes with a light narrow band at the periphery; sometimes with a broad band. *Sculpture*, inconstant, generally shining and smooth, except for rather coarse striae of growth; sometimes finely corrugated on the penult whorl and below the suture on the last whorl, and below, at the junction of the peritreme and umbilical keel; sometimes merely slightly pitted here and there; sometimes with the lines of growth very coarsely developed on the upper whorls; coarse lines of growth within the umbilicus. *Spire*, well elevated, with convex outlines. *Whorls*, 4 $\frac{3}{4}$, moderately rounded, with deep suture above; moderate suture at the termination of the last whorl, which is much depressed. *Aperture*, pyriform, expanded on the right. *Peritreme*, generally very sinuate on the right above. *Umbilicus*, narrow, greatest breadth 0·25, least breadth 0·22. *Umbilical keel*, well developed. *Operculum*, like *C. DeBurghæanus*, only planular on the under side.

Of the largest specimen	{ height 0.71, greatest breadth 0.82, least breadth 0.65.
Of the medium size . . .	{ height 0.51, greatest breadth 0.67, least breadth 0.53.
Of the smallest size . . .	{ height 0.34, greatest breadth 0.45, least breadth 0.35.

C. PRETIOSUS, Chitty. New Hope.

Form, depressed-conic. *Colour*, middling light rich brown. *Sculpture*, 1st, 2nd and 3rd and $\frac{1}{3}$ whorls (except the nuclear apex) very fine, gradually growing very strong and prominent, vertical lines of growth; the rest, finely diamond-cut above and below, except the last third of the last whorl, which is smooth, with fine lines of growth, and sometimes diamond-cut below. Lines of growth coarse within the umbilicus. *Spire*, much depressed, with scarcely convex outlines. *Whorls*, $4\frac{1}{2}$, well rounded, with a deep suture, last whorl much expanded at the aperture on the right and below. *Aperture*, much detached from penult whorl, well rounded, width and height (into the usual angle) 0.24. *Peritreme*, very slightly sinuate above, much thickened in mature shells. *Umbilicus*, wide, greatest breadth 0.15. *Umbilical keel*, moderately developed for little more than half a whorl. *Operculum*, like *C. rudis-planusque*, but with 4 whorls only, and the outer one is in proportion further from the edge. Height 0.41, greatest breadth 0.56, least breadth 0.45.

C. BAIRDIANUS, Chitty.

Form, globose-conic. *Colour*, rich red-brown, with sometimes a lighter band at the periphery and round the umbilical keel, yellowish at the suture on the last whorl. *Sculpture*, fine lines of growth on the upper whorls and fine corrugation on the penult and last; moderately coarse lines of growth within the umbilicus. *Spire*, well elevated, with convex outlines. *Whorls*, 5, well rounded, with deep suture. *Aperture*, much expanded to the left, pyriform. *Peritreme*, rather sinuate above, much projecting at the usual angle. *Umbilicus*, narrow, greatest breadth 0.2. *Operculum*, like *C. seminudus*, but with only 4 whorls, the last rising higher, further from the edge, and spreading more widely than any of this class of opercula, so as almost to form a concave surface, except towards the centre. Height 0.57, greatest breadth 0.65, least breadth 0.57.

C. RUBER, Chitty. Westmoreland.

Form, depressed-conic. *Colour*, very red-brown, especially red on the apex and internally, with a somewhat lighter band at the periphery and round the umbilicus, slightly yellow below the suture on the last whorl. *Sculpture*, very fine lines of growth on the first 3 whorls, and then coarser and coarser, yet fine diamond-cutting throughout; corrugated also below the suture just behind the aperture, and very much where the peritreme and umbilical keel meet; coarse lines of growth within the umbilicus. *Spire*, not much elevated: convex outlines. *Whorls*, 5, well rounded, deep

suture. *Aperture*, very oblique, approaching to straight on the left, and much expanded, especially above on the right. *Peritreme*, slightly sinuate above. *Umbilicus*, narrow, greatest breadth 0·24. *Umbilical keel*, strongly produced within, rather flat outside, continuous round the whorl. *Operculum*, rather concave and convex on the lower side between the types of *C. seminudus* and *C. Jamaicensis*; whorls 6, the margins rising higher before dilation than in *C. seminudus*, and being much broader and rounder than in *C. Jamaicensis*. Height 0·61, greatest breadth 0·88, least breadth 0·7.

This shell has been distributed by Adams as a variety of *C. varians*.

§ IV.

C. JAMAICENSIS, Chemn. See Cat. Phan. p. 13.

I will only add to that description, that the operculum, though generally planular, is sometimes very triflingly concave, and that the last lamella whorl is wide apart from the edge.

C. DENTISTIGMATUS, Chitty. Yallahs Hill and Portland.

Form, depressed-conic. *Colour*, dark olive brown, strong red-brown at the apex and within the aperture. *Sculpture*, coarse lines of growth down to the last quarter of the penult whorl, thence coarse corrugation till it becomes extremely coarse, wide and highly raised at the back of the last whorl, and becomes obsolete at the back of the aperture; below the periphery, smooth with about 14 deep eccentric tooth-like indentations running up to the umbilical keel (thence the name); lines of growth within the umbilicus, not coarse. *Spire*, well elevated, somewhat mammiform, with concave outlines. *Whorls*, $5\frac{1}{2}$, much rounded with a deep suture, last very large and ventricose. *Aperture*, rather oblique, dilated on the right side, large, red-brown within. *Peritreme*, very sinuate above. *Umbilicus*, largely open and funnel-shaped, greatest breadth 0·36. *Umbilical keel*, very prominent and wide. *Operculum*, planular above, lamina of 9 whorls rising higher and much closer than in *C. Jamaicensis*, which it much resembles otherwise; below the margins, the lamina spreads out as in *C. seminudus*, so as to touch each consecutive whorl, and appear to be appressed to the plane, but are *de facto* detached. Last whorl close to the edge, rather concave below. Height 0·9, greatest breadth 1·13, least breadth 0·9.

This shell may be readily known by the tooth-marks which give rise to its name. Its operculum and size distinguish it from *C. Novæ-Spei*.

C. NOVUS-SALTUS, Chitty. New Forest.

Form, depressed-conic. *Colour*, brown. *Sculpture*, throughout fine somewhat close regular striæ of growth, which give a silky appearance. *Spire*, moderately elevated, with convex outlines. *Whorls*, $5\frac{1}{3}$, well rounded, with a deep suture. *Aperture*, circular, not expanded. *Peritreme*, simple. *Umbilicus*, greatest breadth 0·32. *Umbilical keel*, almost obsolete, just visible. *Operculum*, concave

above; spiral lamina of 7 whorls rising as in *C. Jamaicensis*, but much narrower at the margins, which are deflected and expanded on to the plane as in *C. dentistigmatus*, but do not quite so closely approach the consecutive whorl. Height 0.76, greatest breadth 0.97, least breadth 0.77.

C. CRASSUS, Ad. See Cat. Phan., p. 16.

C. INUTILIS, Chitty. (Unique.)

Form, much depressed-conic. *Colour*, light brown; apex red-brown. *Sculpture*, fine lines of growth on the $3\frac{1}{4}$ whorls, thence (for its size) roughly corrugated, except the last quarter of last whorl, where, above, lines of growth are strong, with slight pitting; lines of growth fine within the umbilicus. *Spire*, much depressed, with convex outlines. *Whorls*, 4, well rounded, with very deep suture. *Aperture*, oblique from left to right below, dilated above and much expanded to the right, horizontally elliptical, 0.22 across, 0.2 vertically. *Peritreme*, rather sinuate above, and detached from the penult whorl. *Umbilicus*, open and large, greatest breadth 0.14. *Umbilical keel*, well defined inside umbilicus. *Operculum*, of *C. Jamaicensis* type, concave exteriorly, with lamella of 5 whorls, like *C. crassus*. Height 0.31, greatest breadth 0.46, least breadth 0.35.

§ V.

C. RUPIS-FONTIS, Chitty. Rock Spring, Hanover.

Form, globose-conic, very thick and substantial. *Colour*, deep red-brown, with a broad band of dingy yellow next below the suture on the penult whorl, lighter behind the aperture, red at the apex, light brown at the periphery, and bluish-white inside the aperture. *Sculpture*, fine lines of growth, with a slight corrugation and slight pitting below the suture on the last whorl; lines of growth fine within the umbilicus, somewhat pitted close to the exterior of the umbilical keel. *Spire*, well raised, with convex outlines. *Whorls*, $5\frac{1}{4}$, well rounded with deep suture; last slightly depressed above. *Aperture*, slightly expanded on the right. *Peritreme*, very much thickened, slightly sinuate above. *Umbilicus*, moderately open, greatest breadth 0.22, funnel-shaped. *Umbilical keel*, strongly and broadly produced outside and inside. *Operculum*, planular below and above, plane plain or smooth, lamina with 6 whorls rising high and vertically to the plane exteriorly, thickened at the base and rising with a slight outward slope, so as to make the margin comparatively sharp; termination of the last whorl sharp; last whorl distant from the upraised edge of the plane. Height 0.79, greatest breadth 0.99, least breadth 0.75.

C. CORRUGATISSIMUS, Chitty.

Form, depressed-conic. *Colour*, brown. *Sculpture*, 3 and $\frac{2}{3}$ rds of upper whorls fine lines of growth, thence very much and very coarsely corrugated above and below in zigzag form to close behind

the aperture with deep tooth-like indentations round the umbilical keel; inside the umbilical keel fine striae of growth. *Spire*, not much elevated, with almost straight outlines. *Whorls* 5, well rounded, deep suture. *Aperture*, slightly oblique to the right below, much expanded below. *Peritreme*, much sinuate above, and sinuated throughout. *Umbilicus*, moderately open, greatest breadth 0.31, funnel-shaped. *Umbilical keel*, well developed, not very wide, deeply produced inside. *Operculum*, deep concave, lamina elevated, as in *C. Rupis-Fontis*, 7 whorls of the same character much closer together, and close to outer edge of plane; termination of last whorl inflected and thickened. Height 0.81, greatest breadth 1.1, least breadth 0.81.

§ VI.

C. JUGOSUS, Ad. See Cat. Phan. p. 14. *Hab.* St. Elizabeth.

C. JUGOSUS, var. *parva*, Chitty.

A small variety of this shell occurs. Height 0.52, greatest breadth 0.8, least breadth 0.61.

C. JUGOSUS, var. *striosus*, Chitty.

A still smaller variety occurs, the mouth of which is less dilated, and the sculpture is altogether less corrugated, and which, from above the periphery on the lower part of the last whorl, gives place to close, parallel, diagonal groovings. Height 0.39, greatest breadth 0.6, least breadth 0.5.

C. JUGOSUS, var. *rufilabris*, Chitty.

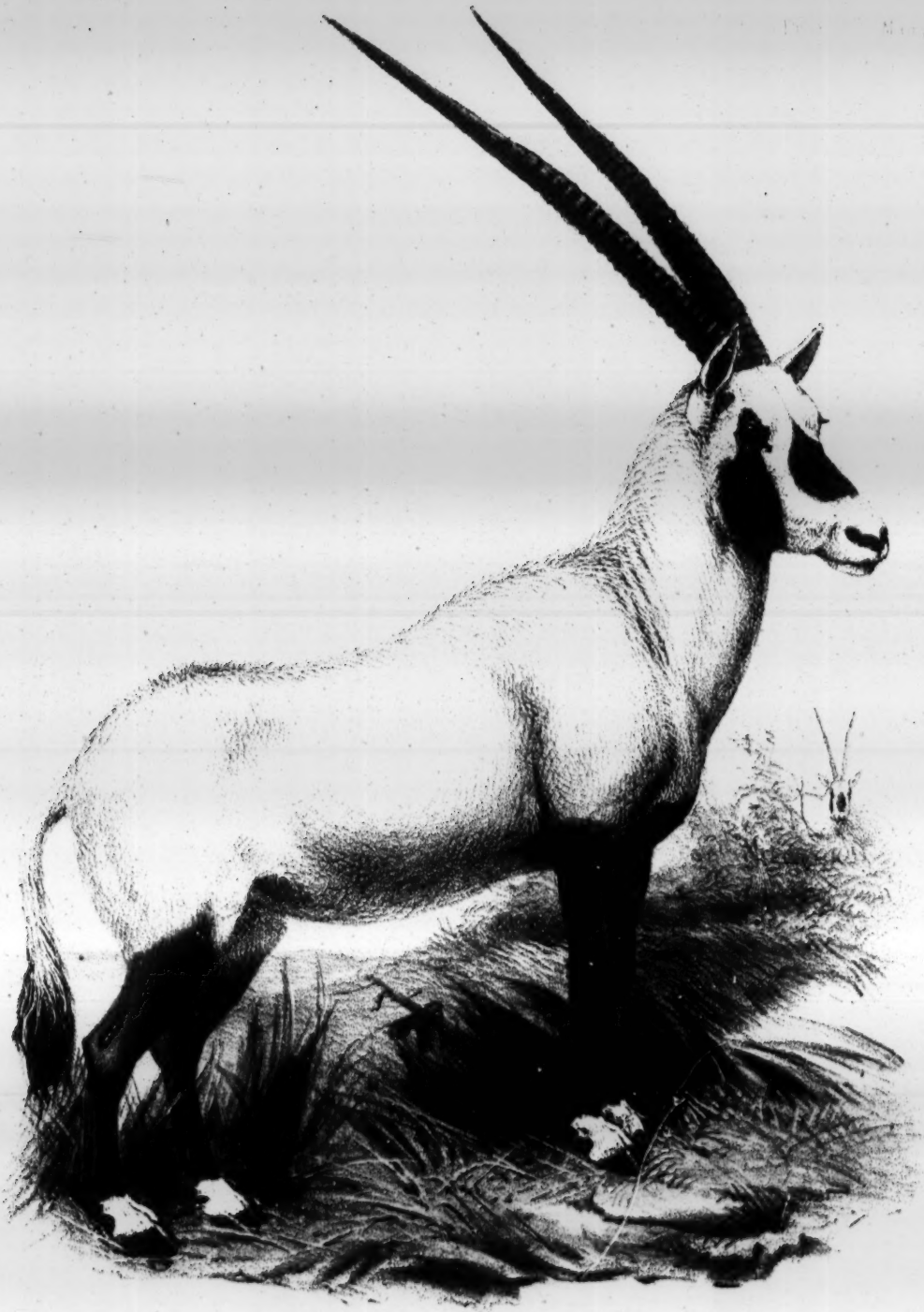
This I doubtfully place as a variety only; if thought otherwise, it may take specific rank as *C. rufilabris*. It is much more conical than *C. jugosus*, brownish on the lip, coarsely corrugate in the site of the obsolete umbilical keel; the umbilicus is very narrow; the end of the last whorl on the operculum is appressed to the preceding whorl. Height 0.61, greatest breadth 0.71, least breadth 0.57.

C. PALLESCENS, Ad. *Hab.* North-east corner of St. Elizabeth, Chitty. See Cat. Phan. p. 14.—Lamella 10 whorls on operculum, and much less raised than in *C. jugosus*.

C. WESTMORELANDENSIS, Chitty. Westmoreland.

Form, subglobose-conic. *Colour*, red-brown, with light brown epidermis; aperture red-brown; apex red. *Sculpture*, fine lines of growth, with slight coarse corrugation over the middle of last whorl, coarse lines of growth inside umbilical keel. *Spire*, well elevated, with slightly convex outlines. *Whorls*, $5\frac{1}{2}$, well rounded, but less above; moderate suture. *Aperture*, well rounded, slightly oblique to the left below, a little dilated on the right below. *Peritreme*, much sinuate above. *Umbilicus*, moderate size, greatest breadth 0.3. *Umbilical keel*, moderately produced. *Operculum*, planular below, but from the increasing height of the whorls of the spiral lamina, apparently concave above; 9 or 10 whorls, closer than in *C. jugosus*,

5 00 58



end of last whorl appressed to preceding one. Height 0·8, greatest breadth 0·97, least breadth 0·81.

C. NODOSUS, Chitty. Maroon Town, St. James.

Form, more depressed-conic. *Colour*, white, with light brown epidermis, brown at lip and on operculum. *Sculpture*, lines of growth, remarkably knotted corrugation on last whorl, pitted deep about umbilical keel, and coarse lines of growth within. *Spire*, depressed, with rather straight outlines. *Whorls*, $5\frac{1}{4}$, well rounded, with deep suture. *Aperture*, rather oblique to the left below. *Peritreme*, slightly sinuate above. *Umbilicus*, wide, greatest breadth 0·3, funnel-shaped. *Umbilical keel*, not wide, but well produced. *Operculum*, small, strong, sharp-edged lamina of 5 or 6 wide-apart whorls, rising almost equally from the flat plane, end of last thickened. Height 0·6, greatest breadth 0·85, least breadth 0·67.

C. BESWICKI, Chitty. Bogue Estate, north-east corner of St. Elizabeth.

Form, subglobose-conic. *Colour*, pinkish, with light brown epidermis. *Sculpture*, very coarse lines of growth, very slight distant corrugation on the last whorl, coarser below; fine lines of growth within umbilical keel. *Spire*, well elevated, with almost straight outlines. *Whorls*, $5\frac{1}{4}$, moderately rounded, with moderate suture. *Aperture*, oblique and much dilated to the right below, depressed above. *Peritreme*, slightly sinuate above, sharp on the right. *Umbilicus*, moderate, greatest width 0·25. *Umbilical keel*, strongly produced. *Operculum*, with lamina of about 9 much incurved close spiral whorls, which are very slightly concave on the entire margins; end of last a little incurved to preceding one. Height 0·75, greatest breadth 0·9, least breadth 0·74.

C. PERPALLIDUS. Near Moore Town, Portland.

This shell was originally brought to me by a negro named Shelly, whom I could never, even by money! excite to sufficient energy to collect more. See Cat. Phan. p. 16. Operculum still wanting.

4. DESCRIPTION OF A NEW SPECIES OF ANTELOPE (ORYX BEATRIX) FROM BOMBAY?, LATELY LIVING IN THE MENAGERIE OF THE SOCIETY. BY DR. JOHN EDWARD GRAY, F.R.S., F.L.S., V.P.Z. & ENT. SOC. ETC.

(Mammalia, Pl. LV.)

The African genus *Oryx* is divided into two sections, according to the form of the horn. In one, the Kookaam, or Gemsbok (*O. gazella*), the horns are straight; in the true *Oryx* (*O. leucoryx*), they are arched and recurved. The former has a black streak along the lower part of the sides, and is found over a large extent of Africa, from the Cape to Abyssinia; for *O. Biessa* of Rüppell ap-

peared to be only a small variety of *O. gazella*, the smaller size depending on some peculiarity in the climate or locality, as is the case with the *Strepsiceros kudu* found in Abyssinia by Capt. Harris, which is only half the size of that inhabiting the Cape of Good Hope. The *O. leucoryx*, on the other hand, which is confined to Senaar and Senegal, is without any indication of the lateral streak.

The animal now under consideration is intermediate between these species; it has the straight horn of *A. gazella* and the plain colour of *A. leucoryx*, but its dark legs and peculiar white feet at once separate it from either.

The animal was presented to the Society by Capt. John Shepherd of the India House; it was regarded in the Gardens as a half-grown *Oryx gazella*, and is said to have been brought from Bombay. A pair was shipped from the latter port, but the female died at sea. The male is now in the Collection of the British Museum.

ORYX BEATRIX. The Beatrice. (Pl. LV.)

The horns slender, straight, or only very slightly curved near the tip, annulated nearly to the tip. White; a spot on the middle of the face, a smaller spot between the base of the horns, a large patch on each cheek, extended above up to the eyes, and united together beneath under the throat; the knees and front of the fore- and hind-legs, and a large spot on the chest, dark blackish brown; the legs to the posterior grey-brown; end of the tail black.

Hab. Bombay, but probably brought from the shores of the Red Sea. Brit. Mus.

This specimen is not half the size of the Gemsboe from the Cape, and is immediately known from it by the distribution of its colours.

In form and size it resembles the true *Oryx* (*O. leucoryx*), but it differs in the straightness of the horn, the size and form of the cheek-spot, and especially in the dark colour of the legs, and the well-marked white ring around the fetlock joint just above the hoof.

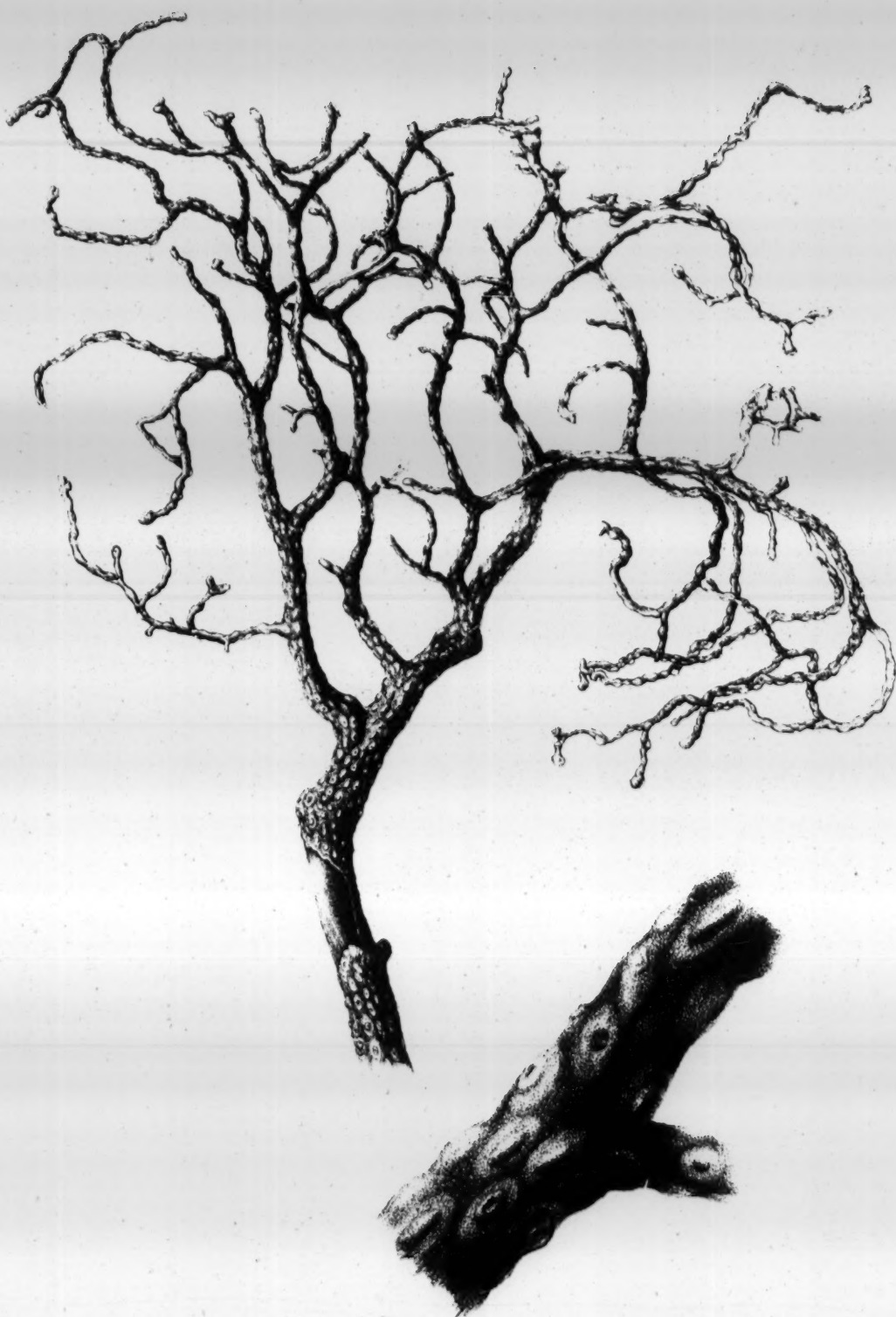
The hair is whorled on the middle of the haunches like the rest of the genus, and the hairs of the back in front of the withers are directed forwards.

5. DESCRIPTION OF NEW GENERA OF GORGONIAE. By DR. JOHN EDWARD GRAY, F.R.S., F.L.S., V.P. Z. & ENT. SOC. ETC.

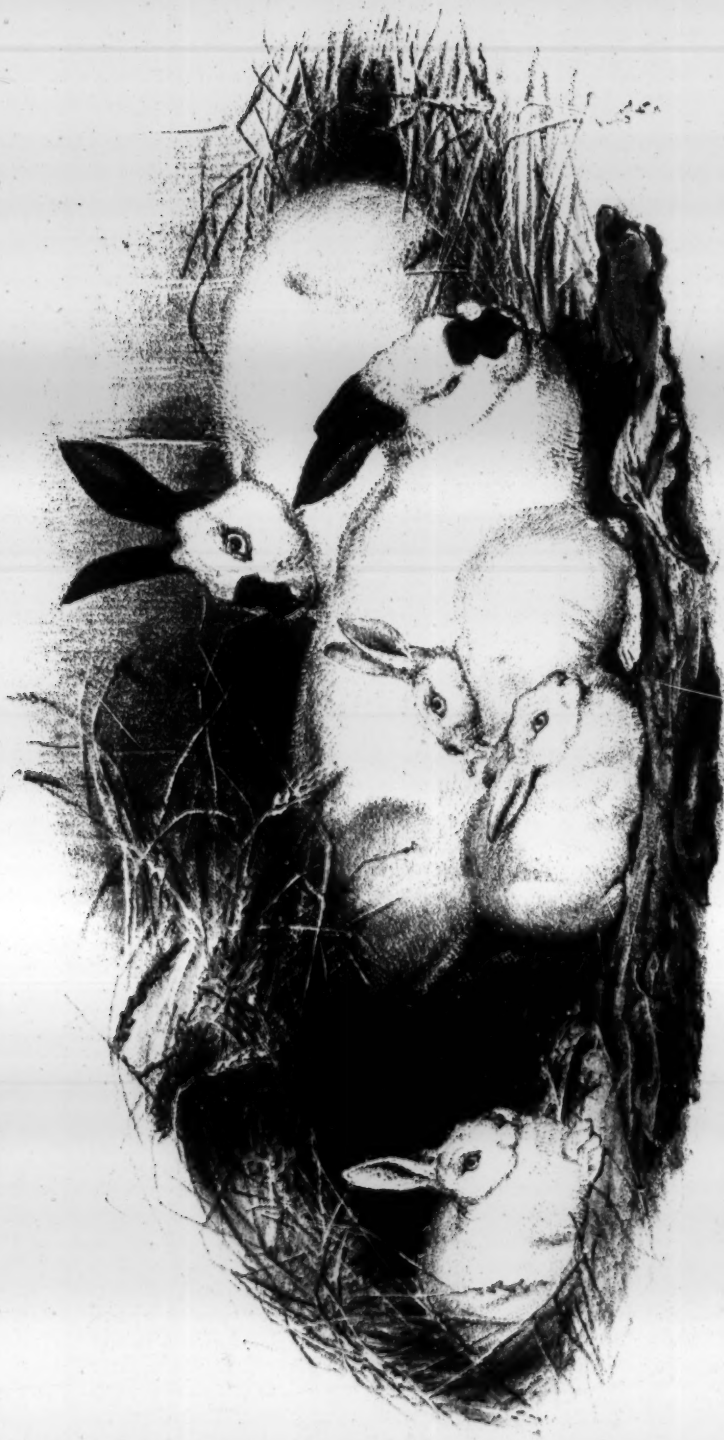
(Radiata, Pl. VIII.)

1. SARCOGORGIA.

The coral rather irregularly furcately branched on a single plane. The axis black, cylindrical, thick at the base, with slender flexible branchlets. The bark fleshy; in the dry state, thin, like a continuous skin, smooth, without spicula, with rather close more or less raised cells, strengthened with a quantity of sand-like granular spicula.



SARCOGORGIA PHIDIPPUS, Gray



This genus is at once distinguished from all the other *Gorgonia* that I have seen, by its thin, smooth, skin-like bark studded with sandy more or less raised wart-like cells, which on the thick stem are numerous all round the surface, scarcely raised, while on the thinner branchlets they are further apart, and form prominent wart-like cells.

The axis is olive-brown, formed of concentric laminae, which often show a space between them at the fractures. When the bark is soaked in potash it is rather thick and flesh-like, and the cells are surrounded with a single series of rather regularly disposed, nearly equal-sized, angular, sand-like, transparent particles, forming a sheath to the polype.

The tentacle of the polypes, when examined in this state, are thick, conical, and simple, without any indication of the pinnate tubercles which are to be seen in the living *Gorgonia*, according to the observations of most naturalists.

I only know of a single species of the genus, which was purchased of a dealer in natural history at Liverpool, without any habitat.

SARCOGORGIA PHIDIPPUS. (Pl. VIII.)

2. SUBERGORGIA.

Coral furcately branched, rather compressed, with a continued sunken groove up the middle of each side. Cell rather prominent, convex, in two or three rather irregular series up each edge. Axis pale brown, wart-like, formed of rather loosely concentric fibrous laminae, containing a large quantity of calcareous matter, and effervescing with muriatic acid. The bark when dry is rather thin, smooth, hard and granular within.

SUBERGORGIA SUBEROSA.

Subergorgia suberosa, Esper. t. 49.

This genus, and the genera *Junceella*, *Ctenocella*, and *Gorgonella* of Valenciennes, should be arranged with *Corallium* under the family *Coralliidae*, characterized by having a calcareous axis.

6. DESCRIPTION OF A RABBIT SAID TO BE FOUND ON THE HIMALAYAN MOUNTAINS. BY A. D. BARTLETT.

(Mammalia, Pl. LVI.)

This animal is smaller than the domestic Rabbit, being shorter and more compact; its body is pure white, the nose, ears, legs and tail are of a dark brownish-black, the eyes dark red.

The fur is much shorter and more nearly equal in length than in the common Rabbit. The young are perfectly white all over until they are five or six weeks old, at which time the nose and tail begin

to get dark-coloured ; the feet soon afterwards get dark, and lastly the ears turn black.

In their movements they appear quicker than other rabbits, and they jump a considerable distance ; some in my possession I have seen leap upon objects 3 feet from the ground. The first specimens of these animals that came under my notice were obtained by Mr. Baker, who informed me that they came from the Himalayas. I have since seen a large number of them, and in no instance have I observed any variation in the colour or markings. They are prolific breeders, and appear extremely hardy.

Having some recollection of hearing a furrier once speak of the skins of the Polish Rabbit, I took an opportunity a few days since to examine a large lot of these skins at a fur warehouse, when I found that they were beyond all doubt from the animal now under notice. Upon inquiry I was told that these skins are imported into this country in large numbers, and extensively used as a substitute for ermine, which fur they much resemble. I find in Mulsant, 'Cours Élémentaire d'Histoire Naturelle,' the following :—"The fur of the White Rabbit, even that of the Polish Rabbit, is easily distinguished from that of the ermine, by its less cylindrical hairs, which are considerably longer than the down." I am also informed that they are bought at the great sale of furs that takes place annually at Leipsic ; to this great fair skins are brought from all parts of the world, and I think it highly probable that these skins are imported from the mountainous parts of Asia.

I have not at present examined the skull of this animal, but should I find sufficient difference upon comparing it with the skulls of the other known species, I shall then propose for it the name of *Lepus nigripes*, or Black-footed Rabbit.

July 14, 1857.

Dr. Gray, F.R.S., V.P., in the Chair.

Mr. Gould having returned from a visit to the United States, whither he had proceeded for the purpose of studying the habits and manners of the species of *Trochilus* frequenting that portion of the American continent, detailed some of the results of his observations.

Having arrived just prior to the period of the bird's migration from Mexico to the north, and having had ample opportunities for observing it in a state of nature, he noticed that its actions were very peculiar, and quite different from those of all other birds : the flight is performed with a motion of the wings so rapid as to be almost imperceptible ; indeed the muscular power of this little creature ap-

pears to be very great in every respect, as, independently of its rapid and sustained flight, it grasps the small twigs, flowers, &c. upon which it alights with great firmness, and if wounded clings to them with the utmost tenacity: it appears to be most active in the morning and evening, and to pass the middle of the day under the shade of the thick leafy branches. Occasionally it occurs in such numbers, that fifty or sixty may be seen on a single tree. When captured, it so speedily becomes tame, that it will feed from the hand or mouth within half an hour. Successful in keeping one alive during a long railway journey, in a gauze bag attached to his breast-button, for three days, during which it readily fed from a small bottle filled with a syrup of brown sugar and water, Mr. Gould determined to attempt the bringing of some living examples to England, in which he succeeded, but unhappily they did not long survive their arrival in London, and died on the second day: had they lived, it was his intention to have sent them to the Society's Gardens, where they would doubtless have been objects of great attraction. Mr. Gould added, that he was certain that they might be readily brought to this country; that they would live in the gardens at least during the months of summer, and that the captains of any of the great steamers now voyaging between England and America would willingly render the assistance requisite to effect this desirable object.

Mr. Gould exhibited a highly interesting species of *Ceriornis*, which he had found in the Collection of Dr. Cabot of Boston, who, with the greatest liberality, permitted him to bring it to England for the purpose of comparison and description. The appearance of this bird is very singular, and the uniform buff colouring of the breast would lead to the supposition that it is merely a variety of one or other of the previously known species of the genus; but the greater length of the tarsi, and the well-defined markings of the back, forbid such a conclusion. For this new bird, forming the fourth species of the genus, Mr. Gould proposed the name of

CERIORNIS CABOTI.

Forehead, sides of the head, nape and chin, black; crest and sides of the neck deep red; all the upper surface mottled with black, rich chestnut, buffy white, and black, the latter colouring assuming the form of a large circular spot at the tip of each feather; this buff mark greatly increasing in size on the scapularies, and the greater wing- and tail-coverts; primaries and tail feathers very dark brown, crossed with toothed markings of buff mottled with black; breast and under surface deep sandy buff stained with red, and black on the flanks, under tail-coverts and thighs.

Total length, $18\frac{1}{2}$; bill, $1\frac{3}{8}$; wing, 10; tail, $7\frac{1}{4}$; tarsi, $3\frac{1}{2}$; middle toe and nail, $2\frac{3}{4}$.

Hab. China.

Remark.—This species is more nearly allied to *C. Temmincki* than No. CCCXXXVII.—PROCEEDINGS OF THE ZOOLOGICAL SOCIETY.

to the other members of the genus. The specimen is believed to be unique.

The following papers were read:—

1. ON STOASTOMIDÆ AS A FAMILY, AND ON SEVEN PROPOSED NEW GENERA, SIXTY-ONE NEW SPECIES, AND TWO NEW VARIETIES FROM JAMAICA. BY THE HON. EDWARD CHITTY.

Stoastomidæ! When I first open my cabinet of this Family to the spectator, two observations are generally made. The one, "How minute! how could you trouble yourself with such specks! they are not worth seeing, for we cannot see them." Then follows, "Well, they *are* very wonderful; but how did you collect them?"

To the first observation I answer, "True, they are but specks, and have very much injured my eyesight; but they *are* worth seeing under the microscope; for they are worthy to rank, and must rank, in point of sculpture, with the most wonderful and beautiful shells known to conchologists, and most of them are most worthy of a sculptor's or designer's study." Among the *Helices*, *Pupæ*, *Achatinæ*, *Cylindrellæ*, *Bulimi*, &c. there are plenty of *minute* species almost microscopic, and interesting enough; but, under the microscope, these only improve in size, and no further beauties are unfolded, and little further interest is given to them by its use. The *Stoastomidæ*, however, are not only wonderful for their minuteness, and from the knowledge that, however minute, they are part of an animal, perfect in its anatomy as that of the largest shell; but the form and sculpture of each species are so marked, that the microscope brings out in each, new beauties and new wonders, entitling them to rank among the most wonderful works in animal creation. And to say the *least* of these *Stoastomidæ*, "They *are* shells, and beautiful ones too, and are not only worthy, but *must*,—being known to exist,—be in every cabinet that pretends to the smallest degree of perfection or completion."

To the second I shall reply by practical information which I think will be valued.

"Easily attained, little valued," may be taken as a good general maxim. But my love for this family arose from a difficulty; and as it involves the history of *Stoastoma*, I may be permitted to relate it.

In the winter of 1848-49 the late Prof. C. B. Adams paid me a visit in Jamaica; and looking over a limited collection, he observed that which is now known as *Stoastoma pisum*. The singularity of its semicircular mouth was noticed by him, as it had been by me; but it then stood alone, and he put it on one side to be described as *Helicina pisum*, hesitating to give it generic importance. He next visited Manchester parish, the principal habitat of *St. pisum*; and meanwhile I, in my own garden in St. Thomas in the East parish, close to Yallahs Hill, found a minute shell with a somewhat similar mouth, about which I corresponded with him. This

turned out to be that wonderful and beautiful speck *St. Wilkinsonæanum*. He again in Manchester collected more specimens of *S. pisum* and other species of the family, and, first under the proposed generic name of "*Hemicyclostoma*," the species were finally placed under the generic name of "*Stoastoma*" at the suggestion of Dr. A. A. Gould. While Adams was still away from me, as I was examining my only specimen of *S. Wilkinsonæanum*, it dropped from my hand—fortunately on to the floor-cloth,—and I did not recover it till after a full hour's careful search. This showed me the folly of being satisfied with the possession of one specimen only, where others *might* be obtained; and I determined to make a vigorous search for more. I ransacked my garden and all round, in vain; for, as I now conclude, it had been brought there accidentally, perhaps by a bird; till at last I crossed a deep ravine, a streamlet at the bottom of it, and got to one side of what we call "Little Yallahs' Hill," which stands a good half-mile crow-fly distance from my garden; there I found a spot, a slope on the hill-side, with crumbling fine dirt running, or sifting as it were, down it. There I *first* found *Geomelania Greyana* (described as *Cylindrella Greyana*, Contrib. Conch. p. 82, till I made out the operculum of that genus). These were so numerous, and many so broken, that I put handfuls of the fine dirt into a small bag for home examination. The result was, plenty of *St. Wilkinsonæanum*, and other new species at the same time.

The plan of collecting all minute shells, beyond this "bagging" of dirt, is, to have a small zinc or tin tray about 9 inches long and 3 wide, with sides turning up all round half an inch high. I put about half a teaspoonful of dirt, such as I have alluded to, into it. Holding the tray at each end, and tilting it the furthest side downwards, shaking it lightly backwards and forwards, right and left, end to end, causes the dirt to fall and spread somewhat evenly along the outer edge; then, *levelling* the tray, a slight jerk from *side to side* of the tray causes the whole of the dirt to spread pretty evenly over the tray's surface, and exposes every minute object to view, with the aid of strong spectacles or a lens. A pointed wetted camel's-hair brush takes up and may deposit the minute subjects into a pill-box, or other receptacle, for future examination. The formation of Jamaica being mostly tertiary limestone, out of about a quart of such dirt as this, I have taken dozens and dozens of minute specimens of no less than thirty-one species, besides larger ones, which the naked eye could well see—probably upwards of fifty species from one quart of dirt altogether!

I am about to describe sixty-one new species, which, added to those described by Adams, make the total of eighty belonging to Jamaica. Yet let it not be imagined for one moment that I consider these are all that inhabit the island: on the contrary, I incline to think that that number might be doubled or trebled were the whole land explored.

I consider that the range of each species is very limited, and that

each spot of land suitable to them will contain distinct species which are not to be found elsewhere. *S. pisum* is a remarkable exception. That shell occurs in the Back Woods or highest mountains in the north of Manchester; at Porus, say ten miles "crow-fly" distance on the east border of Manchester; at Moreland and "Bull dead" in Manchester, say about the same distance south, near the western border: and again it is found at Accompong Town in St. Elizabeth's parish, at (say) twenty-five or thirty miles to the west. And it is curious to observe, that, taking Manchester back woods as the focus, I have collected and received shells from many intermediate spots between it and Porus and Moreland, and Bull dead and Accompong town, without getting one *St. pisum*, although many shells equal or smaller in size of other genera and species. But take any other of the *Stoastomidæ*, and probably you will search for it in vain *outside* of a circumference of three-fourths of a mile from the spot where it first was found. Each such spot will contain probably as many as four or six or seven species; but to that spot all those species are confined. In the following descriptions it will be seen that the habitat of six species is certainly "Peace River:" and that that of eight species is as certainly Yallahs Hill. That latter I have personally explored; one of my residences was near by, and I repeatedly visited it; and I have no hesitation in saying that none of those eight species are to be found at half a mile either way. There are hundreds of spots of this kind in the island never trodden by human foot, and therefore there is no knowing how many *Stoastomidæ* and other minute shells might yet be found, or how many of other genera, from large to small, may yet be added to the terrestrial conchology of Jamaica. The number of unique specimens in my cabinet tells us this truth, I having been a collector *in situ* for years by myself or my black deputies, who are rarely to be bribed into a repetition of a visit to a strange and unwelcome spot.

I must here record my great thanks to my friend Dr. S. Livesay for the personal assistance he has afforded me with some of these troublesome shells; but more especially, not only for the loan of his microscope throughout the labour, but for his most ingenious contrivances, which have been of the greatest help in the examination and measurement of shells, enabling me, by aid of one, to examine all parts by a rotatory motion, and at the same time to readily compare one shell with another; and by aid of another, on the sliding-scale principle, to measure by the thousandth part of an inch with the nicest accuracy and with the greatest facility. Future describing conchologists would do well to make inquiries of that gentleman.

In order to give a clearer understanding of my descriptions, it is well to state how I have proceeded to examine the shell. Dr. Livesay's apparatus consists of a plate on which a battery (as it were) of large pins may be placed in grooves, and kept firm by an upper plate, moveable at one end, so as to admit of removing them when required, and fixed at the other by a hinge. These pins are revolved in their grooves by the fingers, there being a small piece of rounded cork stuck on the point of the pin to lay hold of. The shell is gummed

on to the pin's head, so that the plane of aperture is parallel to the length of the pin, and the axis of the shell at right angles with it. In this position the operculum, if there, or if not, the inside of the aperture, and also the apex and umbilicus, and indeed all parts of the shell, except the point of attachment, can be brought under the microscope by revolving the pin.

Next, let me explain any new terms I may have used. In speaking of "above" or "below," I always consider the apex the uppermost, and the umbilicus the lowermost part. In speaking of "right" or "left," the outer edge of the aperture is considered to be on the right hand.

In pursuing the examination, we give in succession *Form* and *Colour*. Those two are manifest. *Sculpture*: we commence to describe the sculpture of the last whorl, and calculate from below the suture downwards towards the umbilical region at about a quarter from the aperture, or the last quarter or third of the last whorl. *Spiral carinæ* are sculptured raised lines, transverse to the axis or column of a shell. The *spire* and its outlines are self-evident. *Whorls* are counted from the aperture upwards; from that part to where it is opposite or attached to, what is termed, the body whorl, forms one whorl, and so on upwards, the whole, half, third, or quarter being determined by the exact termination of the appearance of a suture at the nuclear apex. The *aperture*, or mouth, though not audibly, speaks its own shape, &c. *Labrum* in *Stoastoma* is the edge of the right-hand portion of the aperture, extending from the suture, as it were, above, round on the right, till it finishes its curve below; the labium being the almost straight part on the left. Labral and labial, coined words, refer to those parts of the edge of the aperture, &c. Labrum "double" denotes a more or less fine, sharp groove close behind the very verge of the labral side of the aperture; and it shows that some at least of *Stoastomidæ* have peristome and peritreme, though never prominent or expanded as in *Choanopoma fimbriatulum*, *C. Chittyi*, and the like.

The "*labral lamella*" is a term we adopt, equivalent to Adams's "spiral lamella," "lamellar spiral keel," "spiral carina continued into the lower extremity of the labrum," &c.; or the "lamelliform keel," "basal margin continued," &c., "small lamella," "raised lamella," &c. of Pfeiffer, Cat. Phan. I call it "*labral*" lamella, because it appears to me to grow out of the labral side of the shell, one specimen of *Lewisia Agassiziana* in progress of development clearly denoting the fact. It answers to the "*umbilical keel*" of some of the *Cyclotus*. In "*measurement*" of height the axis is placed at right angles to the base, so that "height" signifies distance between two parallel lines, the apex touching one, and the extreme lower edge of the aperture touching the other, the axis being at right angles. "Greatest breadth" measures from the edge of the aperture about the periphery to its extreme opposite at the other side of the last whorl, the axis being still at right angles. "Least breadth" is when three parts of the last whorl touch two parallel lines, that is, the plane or edge of the aperture, the back of

the last whorl, and narrowest part of it close to the aperture, or the penult whorl.

With, then, the one species from Polynesia, *Electrina succinea*, the total of *Stoastomidae* amount to 81 species known; and I proceed to propose an entirely new arrangement of them. Professor Adams foresaw the necessity and propriety of it. In his 'Monograph of *Stoastoma*,' p. 4, occur the following passages:—"The value of this genus is equal to that of the Lamarkian genera of *Cyclostoma* and *Helicina*. If these should be generally received as families, subdivided into several genera according to the plan of Dr. L. Pfeiffer, it will be entitled to constitute a distinct family, *STOASTOMIDÆ*. Some of the characters rarely, if ever, occur in other genera, while the specific differences consist partly in slight modifications of these characters. Such are the blunt but not reflected edge of the labrum and the spiral lamella issuing from the umbilicus. The genus has thus a very obvious type, quite distinct from any hitherto discovered. An affinity with the *Cyclostomidæ* is established between *Aperostoma* (Troschel) and the depressed and discoidal species of *Stoastoma*." "Its affinity with the *Helicinidæ* is established between *Lucidella* (Swainson) (?), and some of the conical species, as *S. Redfieldianum* and *S. Leanum*, by their general form and sculpture, and by the form of the base. But observations on the animals will be of more value on this subject. We were not so fortunate as to obtain living specimens. While preparing this Monograph, a correspondent informs us that *S. pisum* when alive is sea-green."

In raising *Stoastoma* into a family, I am thus justified by Professor Adams, and only carry out his views in calling it, Family *Stoastomidæ*, Adams.

Fortunately I happen to be "the correspondent" who found the shell *S. pisum* in "a living state;" when it is, and continues after, if so taken, of a "sea-green" colour externally. I have also examined the outward form of the animal. The following are my rough original notes made long ago upon it:—

"*STOASTOMA PISUM*."

"The animal seems to have but one pair of horns, and is thus shaped.



[The drawing supposes the animal to be in motion.]

"Horns short, thick at base, and pointed. Mollusk black, or of the darkest bottle-green. Seems to aid its progress by its snout."

So different, then, is the animal and shell from either *Cyclostomidae* or *Helicinidae*, that with propriety we may take it out of either family and place it as a distinct family, *STOASTOMIDÆ*, Adams, which I divide into the following genera; adding, however, to Adams' description, "all the species"—"are sculptured with spiral lines;" this, "except very rarely, as in the instance of *S. Philippianum*;" and it is right also to mention, that this family possesses the habit of absorbing part of the internal structure of their shells, as pointed out by Mr. Bland in a paper read before the Lyceum of Nat. Hist. N. Y. (see *Annals*), Feb. 27th, 1854.

The genera will stand thus:—

First, those most singular shells having, as it were, two mouths, such as the only two hitherto known, *St. Agassizianum*, Ad., and *St. Philippianum*, Ad., demand a section to themselves. These and two others I shall call Genus *LEWISIA*, in compliment to Prof. Lewis Agassiz.

Secondly, those beautiful ones, like *St. Gouldianum*, with long projecting termination of the last whorl, and such decided sculpture of a few (four or six) strong transverse striae, with fine ones intervening—being all of subdiscoidal form ("*Gouldia*" being preoccupied among marine shells), I shall call Genus "*WILKINSONÆA*," in honour to the memory of the lady whose name it bears, as well as to that of Adams, it being the second shell of the kind he described: with a subdivision for those devoid of the lengthened last whorl, but with similar sculpture.

Thirdly, those singular shells with somewhat depressed spire, subangulated on the upper part of the last whorl, then *quasi* straight or flat at the periphery, and then subangulated again at the base, Genus "*FADYENIA*," in memory of the lamented author of the 'Flora of Jamaica.'

Fourthly, those shells which represent the *S. pisum*, the first type, and are subglobose, *STOASTOMA*.

Fifthly, depressed conic shells, like unto *S. Chittyianum*, Genus *METCALFEIA*; *S. Chittyianum* being the only one described by Adams.

Sixthly, the globose, discoidal forms, such as *Stoastoma Cumingianum* (that name being elsewhere preoccupied), I call Genus "*PETITIA*," as the second named by Adams, and in compliment to M. Petit de la Saussaye.

Seventhly, globose conic shells, like *S. Lindsleyanum*, I call Genus "*LINDSLEYA*."

And, eighthly, the subdiscoidal, like *S. Blandianum*, I nominate Genus "*BLANDIA*."

In assigning the following new specific names, it will be found that I have adopted Prof. Adams's course of naming them after persons. In his list of nineteen species, only one, *S. pisum*, is otherwise named. I have called all my new genera after persons recorded by Adams,

and all my new species after scientific men, or persons living, well known among conchologists, the exceptions of personal friends being very few. And let me hope, that in so doing, I show the high esteem I feel this family of shells is entitled to, and also my great respect for the names I have made use of.

STOASTOMIDÆ, Adams.

Gen. LEWISIA, Chitty.

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|-------------------------------|------------------------------------|
| 1. L. Agassiziana, <i>Ad.</i> | 3. L. Woodwardiana, <i>Chitty.</i> |
| 2. L. Philippiana, <i>Ad.</i> | 4. L. MacAndrewiana, <i>Ch.</i> |

Gen. WILKINSONÆA, Chitty.

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|-----------------------------------|--------------------------------|
| 5. W. Wilkinsonæana, <i>Ad.</i> | 12. W. Tappaniana, <i>Ad.</i> |
| 6. W. Gouldiana, <i>Ad.</i> | 13. W. Hollandiana, <i>Ad.</i> |
| 7. W. Schomburghkiana, <i>Ch.</i> | 14. W. Dysoniana, <i>Ch.</i> |
| 8. W. Abbottiana, <i>Ch.</i> | 15. W. Hanleyana, <i>Ch.</i> |
| 9. W. Jardineiana, <i>Ch.</i> | 16. W. Bensoniana, <i>Ch.</i> |
| 10. W. Greenwoodiana, <i>Ch.</i> | 17. W. Moussoniana, <i>Ch.</i> |
| 11. W. Laidlawiana, <i>Ch.</i> | |

Gen. FADYENIA, Chitty.

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| 18. F. Fadyeniana, <i>Ad.</i> | 20. F. Grayana, <i>Ch.</i> |
| 19. F. Bowerbankiana, <i>Ch.</i> | |

Gen. STOASTOMA, Ad.

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|----------------------------------|-------------------------------|
| 21. S. pisum, <i>Ad.</i> | 24. S. (Electrina) succineum, |
| 22. S. Pfeifferianum, <i>Ad.</i> | <i>Sowb.</i> |
| 23. S. Livesayanum, <i>Ch.</i> | |

Gen. METCALFEIA, Chitty.

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| 25. M. Metcalfeiana, <i>Ch.</i> | 31. M. Sinclairiana, <i>Ch.</i> |
| 26. M. Chittyana, <i>Ad.</i> | 32. M. Mitchelliana, <i>Ch.</i> |
| 27. M. Bacquiciana, <i>Ch.</i> | 33. M. Dorhniana, <i>Ch.</i> |
| 28. M. Sutherlandiana, <i>Ch.</i> | 34. M. Layardiana, <i>Ch.</i> |
| 29. M. Mörchiana, <i>Ch.</i> | 35. M. Swiftiana, <i>Ch.</i> |
| 30. M. Verreauxiana, <i>Ch.</i> | |

Gen. PETITIA, Chitty.

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| 36. P. Petitiana, <i>Ad.</i> | 39. P. Stevensiana, <i>Ch.</i> |
| 37. P. Cumingiana, <i>Ad.</i> | 40. P. Fortuneana, <i>Ch.</i> |
| 38. P. Anthoniana, <i>Ad.</i> | 41. P. Adamsiana, <i>Ch.</i> |

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| 42. <i>P. Tayloriana</i> , <i>Ch.</i> | 45. <i>P. Grevilleana</i> , <i>Ch.</i> |
| 43. <i>P. Stricklandiana</i> , <i>Ch.</i> | 46. <i>P. Carpenteriana</i> , <i>Ch.</i> |
| 44. <i>P. Stokesiana</i> , <i>Ch.</i> | 47. <i>P. (? Lewisia) Barroniana</i> , <i>Ch.</i> |

Gen. LINDSLEYA, Chitty.

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| 48. <i>L. Lindsleyana</i> , <i>Ad.</i> | 61. <i>L. Gaskoiniana</i> , <i>Ch.</i> |
| 49. <i>L. Pickeringiana</i> , <i>Ch.</i> | 62. <i>L. Newcombiana</i> , <i>Ch.</i> |
| 50. <i>L. Redfieldiana</i> , <i>Ad.</i> | 63. <i>L. Rüsseana</i> , <i>Ch.</i> |
| 51. <i>L. Jayana</i> , <i>Ad.</i> | 64. <i>L. Poeyana</i> , <i>Ch.</i> |
| 52. <i>L. Leana</i> , <i>Ad.</i> | 65. <i>L. Henryana</i> , <i>Ch.</i> |
| 53. <i>L. Denisoniana</i> , <i>Ch.</i> | 66. <i>L. Alderiana</i> , <i>Ch.</i> |
| 54. <i>L. Polyblankiana</i> , <i>Ch.</i> | 67. <i>L. Bridgesiana</i> , <i>Ch.</i> |
| 55. <i>L. Albersiana</i> , <i>Ch.</i> | 68. <i>L. Salléana</i> , <i>Ch.</i> |
| 56. <i>L. Fischeriana</i> , <i>Ch.</i> | 69. <i>L. Arthuriana</i> , <i>Ch.</i> |
| 57. <i>L. Moricandiana</i> , <i>Ad.</i> | 70. <i>L. Gutierreziana</i> , <i>Ch.</i> |
| 58. <i>L. Reeveana</i> , <i>Ch.</i> | 71. <i>L. Oweniana</i> , <i>Ch.</i> |
| 59. <i>L. Shuttleworthiana</i> , <i>Ch.</i> | 72. <i>L. Wollastoniana</i> , <i>Ch.</i> |
| 60. <i>L. Boissieriana</i> , <i>Ch.</i> | |

Gen. BLANDIA, Chitty.

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| 73. <i>B. Blandiana</i> , <i>Ad.</i> | 78. <i>B. Hilliana</i> , <i>Ch.</i> |
| 74. <i>B. Jeffreysiana</i> , <i>Ch.</i> | 79. <i>B. Trailliana</i> , <i>Ch.</i> |
| 75. <i>B. Bairdiana</i> , <i>Ch.</i> | 80. <i>B. Lukesiana</i> , <i>Ch.</i> |
| 76. <i>B. MacGillivrayana</i> , <i>Ch.</i> | 81. <i>B. Loweana</i> , <i>Ch.</i> |
| 77. <i>B. Troscheliana</i> , <i>Ch.</i> | |

Genus I. LEWISIA, Chitty.

Quasi double-mouthed.

LEWISIA AGASSIZIANA, Chitty. See *Stoastoma Agassizianum*, *Ad. Cont. Conch.* p. 158; *Cat. Phan.* p. 234.

The habitat of this shell is near Ackendown, Westmoreland. The "deposit," of which Adams speaks, is still remaining in one of my specimens (the original type), and beyond a doubt is the operculum, like many others I shall describe. It is so fixed in the aperture, that I will not risk its breakage in removal, and so I cannot fully describe it. It is excessively concave in its centre, continued on the labial side in a long, broad, smooth, shining convex plate, shaped like a tongue, and extending almost and sinking into the opposite extreme of "the spiral lamella excessively developed and soldered," &c., as described by Adams.

LEWISIA PHILIPPIANA, Chitty. See *Stoastoma Philippianum*, *Ad. Cont. Conch.* p. 158; *Cat. Phan.* p. 235.

Operculum, still — ?

Hab. Burnt Hill, near Ackendown, Westmoreland, *non* Ackendown.

LEWISIA WOODWARDIANA, Chitty.

Hab. — ? Hanover (unique).

Form, subdiscoidal. *Colour*, very pale horn. *Sculpture*, 14 spiral carinae, widely apart, rather blunt; about 4 visible on the penult whorl, lines of growth well defined. *Spire*, very slightly elevated, with concave outlines. *Whorls*, 4, very slightly rounded, with a lightly impressed suture; last whorl well rounded. *Aperture*, well detached from the body whorl, slightly depressed and slightly constricted, semielliptical. *Labrum*, double, slightly thickened, reflected and rounded off, smooth, plain, not scalloped. *Labium*, straight, edge produced angularly in its centre, and much rounded and reflected towards the umbilicus. *Labral lamella* (see *ante*), rises somewhat abruptly from the labrum, forming a cavity longer in its interior than the aperture, and joins the last whorl below, beyond the umbilicus, by rather a sharp inflection upwards; so that from its junction to outside the labium is not wider than the lesser diameter of the aperture; exteriorly very convex, with a deep suture between it and the last whorl beneath. *Umbilicus*, concealed. *Operculum*, — ?

Height 0.057, greatest breadth 0.083, least breadth 0.07.

Named in compliment to S. P. Woodward, Esq., British Museum, author of 'Manual of Recent and Fossil Shells,' &c.

LEWISIA MACANDREWIANA, Chitty (unique).

Hab. Near the Botanic Garden, St. Andrew's. The smallest *Stoastoma*!

Form, subdiscoidal. *Colour*, pearl white, semitransparent, most likely therefore a young shell. *Sculpture*, 25 equidistant fine spiral carinae. *Spire*, much depressed, with convex outlines. *Whorls*, $3\frac{1}{2}$, well rounded, with rather a deep suture; last whorl well rounded. *Aperture*, well rounded, more than a semicircle, very slightly expanded below; a little detached from penult whorl and very slightly depressed. *Labrum*, slightly double, thin, reflected very shortly, white, shining, smooth, planular. *Labium*, well detached from penult whorl, rather lower than plane of labrum, very slightly curved to the right below. *Umbilicus*, N.B.! apparently very shallow, but covered by an externally convex white callosity, which proceeds from behind the upper end of the labium and covers the umbilicus, and is attached to the body whorl all but at its extreme left; whereunto it may, in older specimens, be entirely soldered. This, though incomplete at the aperture, bears the characters of a complete shell. The *labral lamella* is very slightly produced, rounded at its edge, quite separate from the above callosity on the right, but apparently joining the exterior of it on the left, round the umbilical region.

Height 0.024, greatest breadth 0.046, least breadth 0.036.

I have some doubts as to placing this unique specimen in this subgenus, but think that, from the callosity over the umbilicus and its seeming immaturity, and the appearance that the labral lamella

is not complete, it will, from older or other specimens, be found to be properly classed.

Named in compliment to Robert MacAndrew, Esq., so well known from his valuable dredging operations.

Genus II. WILKINSONÆA, Chitty.

§ 1.

Shell subdiscoidal; last whorl extraordinarily produced. Sculpture, a few strong and many fine carinæ.

WILKINSONÆA WILKINSONÆANA, Chitty.

Hab. Yallahs Hill, East face.

The symmetrical form and beautiful sculpture induce me to rank it first. Is was also the second *Stoastoma* found, though not described till long after *S. Gouldianum*, the latter in Sept. 1849 and the former in Oct. 1850; for Adams at that time was inclined to treat it as a mere variety! *Stoastoma Wilkinsonæanum*, Ad. Cont. Conch. p. 148; Cat. Phan. p. 233.

WILKINSONÆA GOULDIANA, Chitty.

Hab. The backwoods in Manchester's highest mountains, northern region. *Stoastoma Gouldiana*, Ad. See Mon. Stoast. Adams, 1849, p. 5; Cat. Phan. p. 232.

Var. a. Ad.

Same habitat.

Labrum not so much produced above. *Aperture* more cupped and expanded in proportion. (See, as above.)

Var. b. Chitty.

Hab. Trelawny, still further north.

Is much smaller than var. *a.*, and labrum and aperture are miniature of *S. Gouldianum* proper.

Height 0.035, greatest breadth 0.073, least breadth 0.058.

WILKINSONÆA SCHOMBURGHKIANA, Chitty.

Hab. Moreland, Manchester.

Form, subdiscoidal. *Colour*, semitransparent very pale horn. *Sculpture*, lines of growth very apparent; counting from the suture, there are five less prominent and then one very prominent rounded spiral carinæ, three less and one very prominent, two less and one very prominent, two less and one prominent, three less and one very prominent, and eight less, gradually becoming finer round the umbilicus: visible on the upper whorls, three less, one prominent and two less. *Spire*, much depressed, with considerably convex outlines. *Whorls*, $3\frac{2}{3}$ rds, well rounded but flattened at the lower part; suture very lightly impressed. *Aperture*, constricted at more than the width of

the last whorl from the labrum, about 0.015, and then convexly rounded externally and concavely internally; widely expanded, deflected below, subsemielliptical. *Labrum*, leaves the body at about 50°, very much thickened and reflected; pure white; deeply scoloped by the strong spiral carinæ, which form five blunted points. *Labium**, nearly straight above, curved below abruptly to the right and then to the left back again; much below the plane of the labrum, joining it at about the constriction of the aperture above, but rising to the plane below. *Umbilicus*, narrow and deep. *Labral lamella*, very slightly rounded, and projecting at its junction with the labrum, narrow and slightly produced below. *Operculum*, very broadly margined all round by a wide convex fold and a raised lamella on the labral side like the capital italic *D*; very deeply concave, with, in the hollow, three or four rounded raised ridges crossing diagonally from right above to left below, which are finely decussated diagonally from left to right, the labral side finely plaited, the lower left end expanding broadly, and folding over the lower part of the labium in thin plaits or laminae; which plaits are continued on the lower side of the operculum. A very interesting shell.

Height 0.039, greatest breadth 0.074, least breadth 0.053.

Named in honour of Sir Robert Schomburgk, the celebrated traveller in Guiana, and great naturalist, &c.

WILKINSONÆA ABBOTTIANA, Chitty.

Hab. — ? Hanover.

Form, subdiscoidal. *Colour*, white, subtransparent, shining. *Sculpture*, five very strong spiral carinæ, with, at the periphery, two highly microscopic, scarcely visible, intervening the strong lines; three rather stronger, below the lowest strong carina round the umbilicus; one strong on the upper whorls. *Spire*, much depressed, with convex outlines. *Whorls*, 4, very slightly rounded, with a light suture. *Aperture*, extraordinarily produced from the body-whorl, rather constricted far away from the labrum, and rather cupped inwards to the labrum; flattened above, expanded and depressed below, semielliptical. *Labrum*, extraordinarily produced and depressed at the uppermost strong spiral carina, slightly scoloped and pectinated at and by the other strong carinæ, reflected and thickened slightly. *Labium*, widely detached from the body-whorl, very little curved to the right below, very much below the plane of the labrum. *Umbilicus*, shallow and broad. *Labral lamella*, slightly and angularly spread out close to the labrum, then thin and narrow and not concealing the umbilicus. *Operculum*, most extraordinary, and who can describe it?! Very deeply concave in the middle, with a broad raised margin all round, very broad and much rounded on the labial side, which has a largely developed tooth-like horizontal plait or fold half-way down it descending into the hollow, and a much larger one proceeding from the lowest labial side, flowing, as it were, to the left

* It is singular, that out of only ten specimens, every one should have the operculum which partially hides the labium.

well over the labial side, and also over the labium, not concealing the lowest part of the operculum, but showing the lowest part of the labial side to be broad and spreading,—trumpet-shaped. Unfortunately I possess but two specimens, only one having the operculum, which is so firmly fixed in the shell that I dare not further attempt its extraction, and therefore I cannot further examine its extraordinary structure.

Height 0·034, greatest breadth 0·066, least breadth 0·049.

Named in compliment to Captain George Abbott, of the R.W.I. Steam Mail Company's Service (at present commanding the 'Magdalena'), for his great care and attention in procuring and preserving specimens of natural history for the Zoological Society of London.

WILKINSONÆA JARDINEIANA, Chitty.

Hab. Swift River Head, St. George's.

Form, subdiscoidal. *Colour*, very pale horn. *Sculpture*, lines of growth visible; seven strong spiral carinæ, without intervening fine ones; three strong, on upper whorls. *Spire*, slightly elevated, with concave outlines. *Whorls*, 4, moderately convex, with a lightly impressed suture; last whorl wholly detached from the penult, extending about one-third the widest breadth of the shell beyond it, and angularly and pointedly produced above. *Aperture*, slightly constricted about the point of attachment to the penult whorl, then bulging or swelling out and becoming slightly constricted at the labrum; semi-elliptic, but modified by the below-mentioned depression of the labrum, and production of the last whorl, and also, in a corresponding degree, on the lower side. *Labrum*, produced above to an extraordinary degree at the second carina, and there very much depressed or bent inwards, thickened and reflected; very slightly scalloped by the spiral carinæ. *Labium*, much detached from the penult whorl; upon a plane with the lower part of the labrum, but much below it above; slightly sinuate above, and very much so to the right at its junction with the labrum below. *Umbilicus*, moderately deep, only partially concealed by the *labial lamella*, which is narrow and shortly incurved towards the umbilicus. *Operculum*, —?

Height 0·024, greatest breadth 0·059, least breadth 0·042.

Named in compliment to my friend Sir William Jardine, Bart., of Applegarth.

WILKINSONÆA GREENWOODIANA, Chitty.

Hab. — ? Hanover.

Form, subdiscoidal. *Colour*, pale horn. *Sculpture*, lines of growth visible; three fine spiral carinæ and one strong, and so on until the fifth strong carina, below which, round the umbilicus, are six fine carinæ; on the upper whorls one strong in the centre of six fine carinæ. *Spire*, depressed with convex outlines. *Whorls*, 3½, slightly convex, with lightly impressed suture. *Aperture*, separated from penult whorl in an elegant curved line, more than semicircular,

rather flattened above and very slightly expanded. *Labrum*, spreading not very prominently above, white and smooth, slightly reflected and expanded about its centre, pectinated very slightly by four of the stronger carinæ. *Labium*, slightly detached from penult whorl; sinuous, thin, and slightly reflected; on the plane of the labrum below, much below it above. *Umbilicus*, moderately deep and narrow, well circumscribed by the *labial lamella*, which is sharply and slightly produced. *Operculum*, —?

Height 0·032, greatest breadth 0·054, least breadth 0·044.

Named in compliment to Major Greenwood, whose collection of shells from New Zealand was sent by him to the British Museum.

WILKINSONÆA LAIDLAWIANA, Chitty.

Hab. Pool's Rock, Hanover.

Form, subdiscoidal. *Colour*, very pale green. *Sculpture*, 1st, 2nd and 3rd spiral carinæ, strong; 4th strongest; 5th, 6th and 7th strong; 8th strongest; 9th, 10th and 11th strong; 12th strongest; 13th, 14th and 15th strong; 16th strongest; 17th, 18th and 19th strong; 20th strongest; 21st and 22nd stronger; 23rd, 24th, 25th and 26th, round umbilicus, fine; the strong lines are all obsolete behind the aperture; on the upper whorls are 5 strong, 1 strongest, and 2 stronger carinæ. *Spire*, slightly elevated, with convex outlines. *Whorls*, $3\frac{1}{2}$, well rounded, with deep suture. *Aperture*, very slightly constricted at a distance from the labrum, and the strong carinæ become obsolete; thence, aperture well expanded; rather depressed above and expanded below; more than a semicircle. *Labrum*, very double, more so above than below; joins the body-whorl at the constriction by an angle of about 70° ; rather strongly produced at the first strongest carina; deeply and broadly pectinated and scalloped between the strongest carinæ, namely the 4th, 8th, 12th, 16th, and 20th, making five points; slightly thickened and reflected; white. *Labium*, slightly reflected, rather thin, slightly curved to the right above and below; well detached from the body-whorl; below the plane of the labrum. *Umbilicus*, moderately deep, broad; little affected by the *labral lamella*, though it is equally and strongly produced all round. *Operculum*, shallow in the centre and very flatly concave, with two sharp diagonal carinæ across it, from right above to left below: labral side with a broad border and raised lamella: upper end, diagonally plaited from left above to right below, and lower end the same, only from right above to left below.

Height 0·036, greatest breadth 0·064, least breadth 0·048.

Named in kind remembrance of my bosom friend, Henry Laidlaw, Esq., Stipendiary Justice, Manchester, Jamaica.

§ 2.

Last whorl not strongly produced. Sculpture a few strong, and many fine carinæ.

WILKINSONÆA TAPPANIANA, Chitty. See *Stoastoma Tappanianum*, Ad. Cont. Conch. p. 149; Cat. Phan. p. 233.

Hab. Peace River, Manchester.

WILKINSONÆA HOLLANDIANA, Chitty. See *Stoastoma Hollandianum*, Ad. Cont. Conch. p. 149; Cat. Phan. p. 234.

Hab. The back woods of Manchester.

WILKINSONÆA DYSONIANA, Chitty.

Hab. John Crow Hill, Portland.

Form, subdiscoidal or very depressed conic. *Colour*, very pale yellow. *Sculpture*, beautiful,—6 very highly raised sharp spiral carinæ, with about 11 very fine highly microscopic carinæ intervening in the first space below the suture, 9 on the second space, 7 on the third, fewer on the fourth and fifth, and very numerous beyond the sixth strong carina round the umbilicus. On the upper whorls, one strong carina in the middle, and one close above the suture, with a proportionate number of very fine intervening. *Spire*, slightly elevated, with very convex outlines. *Apex*, sharp. *Whorls*, 4½, scarcely rounded, with very light suture; last whorl scarcely produced from the body-whorl. *Aperture*, very slightly constricted at the fauces, not expanded, except very slightly below. *Labrum*, pectinated and very slightly scalloped by the six strong carinæ, thin and sharp. *Labium*, detached from the penult whorl; on a plane with the labrum, very slightly rounded above, much below to the right. *Umbilicus*, very deep and suddenly narrowed. *Labral lamella*, very strongly produced close to the labrum above, less prominent round the umbilicus. *Operculum*, slightly concave in the middle, with a deep broad margin all round, very fine granulations in the hollow, with (?) four very fine distant carinæ crossing diagonally from right above to left below.

Height 0·04, greatest breadth 0·066, least breadth 0·053.

Named in compliment to the memory of the late Mr. David Dyson of Salford, so well known for his zoological researches in Central America, Venezuela, &c.

WILKINSONÆA HANLEYANA, Chitty.

Hab. Pool's Rock, Hanover.

Form, subdiscoidal, or very depressed conic. *Colour*, pale horn. *Sculpture*, lines of growth, wide apart: 3 strong spiral carinæ; 4th, stronger; 3 strong; 8th, stronger; 3 strong; 12th, stronger; 3 strong; 16th, stronger; 2 strong; 19th, stronger; and 4 strong round the umbilicus. On the upper whorls, 3 strong; 1 stronger; and 3 strong. *Spire*, slightly elevated, with straight or very slightly

concave outlines. *Whorls*, $3\frac{1}{2}$, well rounded with light suture. *Aperture*, much constricted behind the labrum, and then much dilated; depressed above and expanding below; subsemicircular. *Labrum*, double, slightly produced above; pectinated and slightly scalloped by the five stronger carinae; attached to the body-whorl and produced at an angle of about 70° ; slightly thickened and reflected. *Labium*, much lower than the plane of the labrum above; less so, below, moderately detached from the body-whorl; rather curved at both extremities. *Umbilicus*, shallow and broad, not affected by the labral lamella, which is fine and narrow throughout. *Operculum* —?

Height 0.041, greatest breadth 0.061, least breadth 0.047.

Named in compliment to Sylvanus Hanley, Esq., author of 'British Shells,' &c.

WILKINSONÆA BENSONIANA, Chitty.

Hab. Roaring River, Westmoreland.

Form, subdiscoidal. *Colour*, rather dark brown. *Sculpture*, six prominent sharp spiral carinae intermingled with eighteen less strong: on the upper whorls, one strong between about six less strong. *Spire*, very little elevated, with slightly concave outlines. *Whorls*, $3\frac{1}{2}$, slightly rounded with a very light suture. *Aperture*, semicircular, depressed above in the uppermost third, much expanded below. *Labrum*, much and pointedly produced above, at an angle of about 75° from the body-whorl, white, slightly thickened and reflected, angulated, not pectinated, by all five points of the sharper carinae. *Labium*, rather curved below, much detached from body-whorl, on a plane with the labrum at the lower end, much below it above. *Umbilicus*, rather deep and broad. *Labral lamella*, regularly produced, strong but narrow, subangularly pointed close at the labrum. *Operculum*, moderately concave, serpentine on the labial side, with a groove on the labral side.

Height 0.027, greatest breadth 0.049, least breadth 0.038.

Named in compliment to W. H. Benson, Esq., who has contributed so much to our Indian land-shells.

WILKINSONÆA MOUSSONIANA, Chitty.

Hab. Yallahs Hill.

Form, subdiscoidal. *Colour*, white, semitransparent. *Sculpture*, 22 lines, four of which are very slightly stronger than the rest, lowest most strong and prominent; on the upper whorls, 7. *Spire*, slightly elevated, with convex outlines. *Whorls*, $3\frac{1}{2}$, slightly rounded, with a light suture. *Aperture*, slightly expanded and depressed below, more than a semicircle. *Labrum*, thickened and reflected, double above, very slightly scalloped by the four stronger carinae, or rather the labrum is produced in straight lines to meet each stronger carina, forming three straight lines scarcely pectinated, in octagonal shape, moderately and roundly produced above from the body-whorl. *Labium*, rather curved, below the plane of the labrum above, moderately detached from the body whorl. *Umbilicus*, deep. *Labral lamella*, sharply, finely and uniformly produced. *Operculum*, slightly

concave, smooth, with ? two strong rounded carinæ vertically crossing the hollow.

Height 0.035, greatest breadth 0.058, least breadth 0.042.

Named in compliment to Prof. A. H. Mousson of Zurich, Switzerland.

Genus III. FADYENIA, Chitty.

Spire depressed, subangular on the upper part of the last whorl, subplanulate at the periphery, subangulate below, and subplanulate round the umbilicus.

FADYENIA FADYENIANA. See *Stoastoma Fadyenianum*, Ad. Mon. Stoast. Adams, 1849, p. 7; Cat. Phan. p. 231.

Hab. Hills S.W. of Port Henderson.

Other shells, I have reason to know, have been distributed for this.

FADYENIA BOWERBANKIANA, Chitty.

Hab. Roaring River, Westmoreland.

Form, subdiscoidal. *Colour*, very pale tinge of brown. *Sculpture*, 24 strong equidistant (above) spiral carinæ, wider apart below, and more faint round the umbilicus, and obsolete at the labrum; with a hiatus between the 13th and 14th, equal to the space occupied by 3 carinæ, at the periphery; 7 visible on the upper whorls. *Spire*, much depressed with concave outlines. *Apex*, mammillated. *Whorls*, 4, well rounded above, with a deep suture; last whorl rather large and expanded; subangular at the upper part, subplanulate at the periphery, and subangular below, subplanulate, but more convex round the umbilicus than in *F. Fadyeniana*; the whorl is much wider above than below, so that the subplanulate periphery is nearly at right angles with the outline of the spire. It is the same in *F. Fadyeniana*. *Aperture*, very slightly constricted above behind the labrum; dilated, large; rather more constricted below, behind, and at the labrum; upper third flattened almost at a right angle with the labium; well rounded below. *Labrum*, simple, white. *Labium*, on a plane with the labrum, well detached from the body-whorl; thickened and reflected towards the umbilicus, more so below than above; much rounded to the right below. *Umbilicus*, rather deep. *Labral lamella*, well defined, strong and prominent, and inflected upwards towards the umbilicus. *Operculum* —?

Height 0.041, greatest breadth 0.08, least breadth 0.063.

Named in compliment to my friend and fellow-labourer in science, Dr. L. Q. Bowerbank, M.D., of Kingston, Jamaica.

Note.—In *F. Fadyeniana* fine spiral carinæ intervene the coarser, and all are more distantly apart.

FADYENIA GRAYANA, Chitty.

Hab. Yallahs Hill.

Form, subdiscoidal. *Colour*, rich light brown. *Sculpture*, about 33 irregular and inequidistant, some fine and some rather strong, No. CCCXXXVIII.—PROCEEDINGS OF THE ZOOLOGICAL SOCIETY.

spiral carinæ, of which 8 or 9 are visible on the upper whorls. *Spire*, much depressed, less than in *F. Bowerbankiana*, with concave outlines. *Apex*, mammillated. *Whorls*, $4\frac{2}{3}$ rds, with a moderate suture; last whorl typical, subangulated and subplanulated as in *F. Bowerbankiana* and *F. Fadyeniana*. *Aperture*, semicircular, only slightly affected by the subangularity above and below the periphery, very slightly dilated. *Labrum*, double; outer edge pectinated by the spiral carinæ, inner edge simple, white and shining. *Labium*, white, thickened and reflected towards the umbilicus about its centre, below much curved to the right, much lower than the plane of the labrum at its lower end; widely separated from the body-whorl. *Umbilicus*, very deep and narrow. *Labral lamella* very broadly and sharply produced throughout; besides the labral lamella within the umbilicus, extending from the back of the labium to the umbilicus and body-whorl, are four or five well-produced distinct sharp lamellæ. *Operculum*, deep concave in the centre, and a broad margin all round, which, on that side, folds well over the labrum, especially below; much covered by numerous coarse granulations, and in the hollow on the labral side with four or more strong raised lamellæ, which are also covered with coarse granulations.

Height 0·076, greatest breadth 0·105, least breadth 0·087.

Named in compliment to Dr. J. E. Gray, British Museum.

Genus IV. STOASTOMA, Adams.

Shell subglobose.

STOASTOMA PISUM, Ad. See Mon. Stoast. Adams, 1849, p. 11; Cat. Phan. p. 228.

Sculpture, almost obsolete, very numerous raised spiral microscopic carinæ, which are well defined on the upper whorls, four or five being visible. *Labrum*, double. *Labium*, well detached from the penult whorl. *Operculum*, concave and finely granulated in its concavity.

Hab. Manchester, generally, and near Accompong Town, St. Elizabeth.—*Chitty*.

STOASTOMA PFEIFFERIANUM, Ad. See Mon. Stoast. Adams, p. 8; Cat. Phan. p. 230.

Labrum, double. *Operculum*, concave, finely granulated in its concavity; margin sharp on the labral side, rather broad, but not thickened on the labial side.

Hab. Manchester back woods.—*Chitty*.

STOASTOMA LIVESAYANUM, Chitty.

Hab. Near Ashley Hall, Trelawny.

Form, subglobose. *Colour*, pale yellow. *Sculpture*, 11 distant, blunt and raised spiral carinæ, of which 5 are visible on the upper whorls. *Spire*, conic, moderately elevated, with slightly convex out-

lines. . *Whorls*, $4\frac{2}{3}$ rds, scarcely rounded, with a very light suture. *Aperture*, very slightly expanded; semielliptical, widest in the upper third of the labrum, very oblique. *Labrum*, pectinated by the spiral carinae; double, very slightly reflected. *Labium*, slightly below the plane of the labrum, well detached from penult whorl, but connected with it by five or six of the spiral carinae; arcuated to the left above into a sharp angle with the labrum, very much curved below to the right. *Umbilicus*, very small and deep. *Labral lamella*, strongly produced above, but immediately lost in the umbilicus. *Operculum*, semielliptical, planular, with fine granulations on the labral side, and concave on the labial side, with a raised ridge all round, which is much thickened and rounded, and highly raised about the lower part of the labral side.

Height 0·081, greatest breadth 0·103, least breadth 0·08.

Named in compliment to my friend Dr. Livesay, a devoted collector of genera.

STOASTOMA, or ELECTRINA, SUCCINEUM, Sowerby, will belong to this group. See Cat. Phan. p. 228.

Genus V. METCALFEIA, Chitty.

Shell, depressed conic.

METCALFEIA CHITTYANA, Chitty. See *Stoastoma Chittyana*, Ad. Mon. Stoast. Ad. 1849, p. 10; Cat. Phan. p. 231.

Hab. Peace River, Manchester.

Operculum, very slightly concave, with two strong lamellæ crossing its centre horizontally, and on the labial side two much finer ones above, and three or four below.

METCALFEIA METCALFEIANA, Chitty.

Hab. — ? Hanover.

Form, depressed conic. *Colour*, pale horn. *Sculpture*, lines of growth visible; sixteen strong, but not much raised inequidistant spiral carinae; those round the umbilicus being most prominent, with here and there one very fine carina intervening. On the upper whorl, 5 carinae. *Spire*, moderately elevated with very slightly concave outlines. *Apex*, obtuse. *Whorls*, $4\frac{1}{2}$, very moderately convex, with a lightly impressed suture. *Aperture*, subsemicircular, slightly spreading. *Labrum*, subangularly produced from the body-whorl, not abruptly produced, deeply pectinated by the spiral carinae. *Labium*, slightly detached from the body-whorl, very slightly curved below to the right; much below the plane of the labrum. *Umbilicus*, very deep and narrow. *Labral lamella*, very little, but sharply, produced, not concealing the umbilicus. *Operculum*, slightly concave, finely granulated in the hollow with three strong apparently not serrated horizontal lamellæ, extending from the labral side over two-thirds of the width of the operculum, and one equally strong between

the first and second above extending one-third across only, the lowest slightly curved downwards.

Height 0.073, greatest breadth 0.096, least breadth 0.079.

Named in compliment to W. Metcalfe, Esq., the possessor of a fine cabinet of shells.

METCALFEIA BAQUIÉANA, Chitty.

Hab. Near "The Cave," high road, Westmoreland.

Form, depressed conic. *Colour*, rich brown, fading into faint yellow and white. *Sculpture*, 19 spiral carinae, with one fine intervening each pair. On the upper whorls 6 carinae. *Spire*, moderately and rather concavely elevated. *Whorls*, $4\frac{1}{2}$, slightly rounded with a lightly impressed suture. *Aperture*, slightly expanded, shortly and roundly produced from the penult whorl, scarcely depressed; sub-semicircular, rather dilated above. *Labrum*, pectinated by all the stronger carinae, slightly scalloped. *Labium*, slightly detached from the penult whorl, rather abruptly detached from the labrum above and curved below to the right, much lower than the plane of the labrum below. *Umbilicus*, not deep. *Labral lamella*, expanded above, narrow round the umbilicus. *Operculum*, concave in the middle, seven lamellae radiating horizontally from the labial side, one short and central above, one (the longest) crossing the hollow, one short on the labral side, one longer (second in length), one short, and two longer (third in length) below.

Height 0.06, greatest breadth 0.089, least breadth 0.071.

Named in compliment to my bosom friend, Mons. Baquié, of Westmoreland, Jamaica.

This shell is closely allied to *Metcalfeia Chittyana* at first glance, but differs in many minute particulars; the pectination on the labrum is alone sufficient to distinguish it; and their habitats are about sixty miles asunder. The spire is more conical than in *M. Chittyana*, spiral carinae more distant, labium less widely detached from penult whorl, upper part of labrum more produced, apex is more blunt. In *M. Chittyana* the labral lamella expands suddenly above close to where it leaves the labium, rising above the plane of the aperture, and then descending round the umbilicus in a uniform curve without projecting; in *M. Baquiéana* it does not rise above the plane; but after leaving the labium, it spreads out towards the centre of the umbilicus, and continues uniform till it is lost in the umbilicus. In the former the lower end of the labium is on a plane with the labrum, in this it is below the plane. In this, the aperture is larger and more oblique, and the last whorl is less expanded.

METCALFEIA SUTHERLANDIANA, Chitty.

Hab. Belmont, St. James.

Form, depressed conic. *Colour*, very pale horn or white. *Sculpture*, lines of growth visible; 19 rather strong inequidistant spiral carinae, with an unequal number of finer ones intervening. On the upper whorls 5 carinae. *Spire*, moderately and rather concavely elevated. *Whorls*, 5, moderately elevated, with a deep suture.

Aperture, less than a semicircle, slightly expanded in the lower two-thirds, slightly oblique. *Labrum*, unequally and not strongly pectinated by the spiral carinæ, very slightly produced above. *Labium*, well detached from the body-whorl, attached to labrum above in a slight curve, very slightly waved in its centre, and well curved to the right below. *Umbilicus*, moderately deep, and labral lamella moderately produced. *Operculum*, — ?

Height 0·072, greatest breadth 0·12, least breadth 0·079.

Named in compliment to Dr. P. Sutherland, the Arctic voyager, now Government Surveyor of Port Natal.

METCALFEIA MÖRCHIANA, Chitty.

Hab. Roaring River, Westmoreland.

Form, depressed conic. *Colour*, very pale horn. *Sculpture*, 5 strong spiral carinæ, 1 fine; 7th strong and 3 fine; 8th to 15th strong and 1 fine intervening each; on the upper whorls 8 strong. *Spire*, slightly elevated with concave outlines. *Whorls*, $4\frac{2}{3}$, very slightly rounded with a light suture. *Aperture*, slightly expanded, more below than above; slightly produced, abruptly from the penult whorl: more than a semicircle. *Labrum*, thin, and very slightly reflected; pectinated by the strong carinæ. *Labium*, on a plane with the labrum above, lower below; joining the labrum with a curve above; much curved to the right, below well detached from the penult whorl. *Umbilicus*, narrow and deep. *Labral lamella*, well produced above and rather wide below. *Operculum*, moderately concave in the middle, with a wide border on the labial side, which is vertically grooved and again crossed by four or five raised horizontal plaits: labral side with about eight short horizontal lamellæ, about four extending across the hollow, and a linguiform point at the lower extremity of the labial side overlapping the labium.

Height 0·072, greatest breadth 0·1, least breadth 0·074.

Named in compliment to M. Mörch, of Copenhagen, distinguished for his knowledge of Mollusca.

METCALFEIA VERREAUXIANA, Chitty.

Hab. — ? Hanover.

Form, depressed conic. *Colour*, pale horn or yellow. *Sculpture*, 17 strong spiral carinæ with 1 fine intervening each. On the upper whorls 5 strong with 1 fine intervening. *Spire*, moderately elevated, with straight outlines. *Whorls*, $4\frac{1}{3}$, moderately rounded, with a light suture. *Aperture*, scarcely separated from the body-whorl, more than a semicircle, large, rather expanded and depressed below. *Labrum*, very slightly produced above, strongly and prominently pectinated by the strong carinæ, imbricated in those round the periphery, white and shining. *Labium*, slightly rounded into the labrum above, and on the right below; very slightly reflected; on a plane with the labrum above, lower below; very slightly detached from the body-whorl. *Umbilicus*, deep and narrow. *Labral lamella*, sharp and very slightly produced. *Operculum*, moderately concave, with large coarse granulations on the upper part of the labial side,

slightly lamellated horizontally; lower portion of labial side broad and spreading over the labium, with a deep groove, and terminating with a broad uplifted linguiform plait, which is distinct from the spreading upper portion.

Height 0.06, greatest breadth 0.078, least breadth 0.06.

Named in compliment to M. Verreaux, an experienced zoological collector.

METCALFEIA SINCLAIRIANA, Chitty.

Hab. Maroon Town, St. James (unique).

Form, depressed conic. *Colour*, pale horn or yellow. *Sculpture*, 9 strong spiral carinae, with one fine intervening; on the upper whorls, 3 strong and fine ones intervening. *Spire*, slightly elevated, with rather concave outlines. *Apex*, rather acute. *Whorls*, $4\frac{1}{2}$, moderately rounded, with a light suture. *Aperture*, slightly spreading about the periphery to below; subsemicircular. *Labrum*, very slightly produced above, more so below; broadly detached from the body-whorl, strongly pectinated by the spiral carinae. *Labium*, well detached from the body-whorl, on a plane with the labrum above, lower below, slightly curved to the right above, much so below, much thickened. *Umbilicus*, narrow and deep, well covered by the labral lamella. *Operculum*, —?

Height 0.057, greatest breadth 0.084, least breadth 0.067.

Named in compliment to Dr. Andrew Sinclair, R.N., late Colonial Secretary of New Zealand.

METCALFEIA MITCHELLIANA, Chitty.

Hab. Maroon Town, St. James (unique).

Form, depressed conic. *Colour*, pale horn. *Sculpture*, 15 strong spiral carinae, rather inequidistant, with one very fine intervening, and about the periphery sometimes two and sometimes three fine carinae: at the periphery the two strong carinae are widest apart, with three fine intervening; the next division below has one fine only, and the next below, two; on the upper whorls four strong carinae. *Spire*, slightly elevated, with rather concave outlines. *Whorls*, $4\frac{1}{2}$, slightly rounded, with a moderate suture; last whorl expanded above and falling away below. *Aperture*, semicircular, much dilated below the periphery. *Labrum*, very slightly pectinated by the strong carina, very slightly produced above. *Labium*, on a plane with the labrum above, much lower below; slightly curved to the right below, moderately detached from the body-whorl. *Umbilicus*, deep, little affected by the labral lamella. *Operculum*, —?

Height 0.07, greatest breadth 0.095, least breadth 0.077.

Named in compliment to D. W. Mitchell, Esq., the energetic Secretary of the Zoological Society of London.

METCALFEIA DORHNIANA, Chitty.

Hab. Pedro District, St. Ann's.

Form, depressed conic. *Colour*, pale horn. *Sculpture*, 4 strong spiral carinae and 1 fine, 1 strong and 1 fine, 1 strong and 3 fine,

1 strong and 2 fine, and 1 strong and 3 fine, 1 strong, then 8 strong with fine intervening; on the upper whorls, 5 spiral carinæ. *Spire*, slightly elevated, with concave outlines. *Whorls*, 4, very slightly rounded with a moderate suture. *Aperture*, more than a semicircle, moderately expanded, very oblique. *Labrum*, moderately produced above, reflected, much pectinated by the strong spiral carinæ. *Labium*, well detached from the body whorl, curved to the right below, straight above, almost on a plane with the labrum. *Umbilicus*, deep and moderately broad. *Labral lamella*, strong, sharp and expanding, with a projecting angular point a little below its junction with the labrum. *Operculum*, —?

Height 0.052, greatest breadth 0.079, least breadth 0.061.

Named in compliment to Herr Heinrich Dohrn, of Stettin, a zealous young conchologist.

METCALFEIA LAYARDIANA, Chitty.

Hab. —? Westmoreland.

Form, depressed conic. *Colour*, rich light brown. *Sculpture*, about 25, slightly, unequally raised, inequidistant spiral carinæ; on the upper whorls 6 or 7. *Spire*, moderately elevated, with rather concave outlines. *Whorls*, $4\frac{1}{2}$, moderately rounded, with a moderate suture; last whorl well rounded. *Aperture*, moderately oblique, very moderately expanded and slightly deflected below, semicircular. *Labrum*, slightly produced above in a curved line, pectinated by about 15 of the spiral carinæ. *Labium*, moderately detached from the body-whorl, rather serpentine above and much curved to the right below. *Umbilicus*, deep and narrow. *Labral lamella*, but slightly expanded. *Operculum*, slightly concave, with about six horizontal raised lamellæ, nearly parallel above, but converging towards the umbilicus below, strong on the labial side, and faintly crossing over the labial side and covering the labium, with, on that side, others intervening.

Height 0.062, greatest breadth 0.086, least breadth 0.069.

Named in compliment to E. L. Layard, Esq., late of Ceylon, now Curator of the Museum, Cape Town, Cape of Good Hope.

METCALFEIA SWIFTIANA, Chitty.

Hab. Near Mr. Channer's, Santa Cruz Park, Saint Elizabeth (unique).

Form, depressed conic. *Colour*, pale horn, light brown at apex. *Sculpture*, 28 irregularly strong and inequidistant spiral carinæ; on the upper whorls 6. *Spire*, moderately elevated, with slightly concave outlines. *Whorls*, $4\frac{1}{2}$, moderately rounded, with a deep suture; last rather large. *Aperture*, slightly constricted and very slightly expanded at its margin; semicircular; slightly depressed above and slightly expanded below. *Labrum*, very slightly produced above; very slightly pectinated externally by, more or less, all the carinæ; smooth and white and shining at its extreme margin. *Labium*, well detached from body-whorl, on a plane with the labrum; much curved

to the right below and reflected to the left. *Umbilicus*, deep and narrow. *Labral lamella*, widely spreading. *Operculum*, — ?

Height 0·059, greatest breadth 0·087, least breadth 0·069.

Named in compliment to Robert Swift, Esq., of the Island of St. Thomas, an ardent collector.

Genus VI. PETITIA, Chitty.

Shell, globose discoid.

PETITIA PETITIANA, Chitty. See *Stoastoma Petitianum*, Ad. Ann. Lyc. New York, v. n. 2. p. 67; Contr. Conch. p. 151; Cat. Phan. p. 232.

Hab. Peace River, Manchester.

PETITIA CUMINGIANA, Chitty. See *Stoastoma Cumingianum*, Ad. Mon. Stoast. Ad. 1849, p. 9; Cat. Phan. p. 231.

Hab. — ? Manchester.

Note.—If I have the right type of this shell, the *operculum*, in addition to the “numerous lamellar grains” described by Adams, has 6 or 7 very slightly raised vertical lamellæ curving from above to the left below, with an inner raised margin inclosing the concavity and sloping outwards to the extreme edge of the operculum.—*Chitty.*

PETITIA ANTHONIANA, Chitty. See *Stoastoma Anthonianum*, Ad. Contr. Conch. p. 151; Cat. Phan. p. 232.

Hab. — ? Manchester.

PETITIA STEVENSIANA, Chitty.

Hab. Yallahs Hill.

Form, globose discoid. *Colour*, very light brown. *Sculpture*, 23 well-raised inequidistant spiral carinæ, wider apart below round the umbilicus; on the upper whorls 7. *Spire*, slightly elevated, with convex outlines. *Whorls*, 4, well rounded, with a deep suture. *Aperture*, subelliptical, well detached from the body-whorl; slightly constricted and scarcely expanded, and but little deflected below. *Labrum*, double, outer edge very finely pectinated by the spiral carinæ; inner edge white, smooth, slightly thickened and reflected; continuous with the labium above, with a slight curve. *Labium*, almost straight, very slightly curved to the right below, where it is below the plane of the labrum. *Umbilicus*, deep. *Labral lamella*, produced to a saw-like tooth at some little distance below its junction with the labium; convex externally. *Operculum*, — ?

Height 0·047, greatest breadth 0·086, least breadth 0·065.

Named in compliment to the naturalist's universal friend, S. Stevens, Esq., Bloomsbury Street, London.

PETITIA FORTUNEANA, Chitty.

Hab. — ? Manchester.

Form, globose-discoid. *Colour*, very pale horn. *Sculpture*, 25 spiral carinae, about 8 on the upper whorls. *Spire*, much depressed, with convex outlines. *Whorls*, 4, moderately rounded, with light suture. *Aperture*, constricted at about the width of the last whorl from the labrum, and then expanded considerably at about an angle of 30°, expanded above and deflected slightly below; more than a semicircle. *Labrum*, slightly double, especially above and below, less at the periphery; inner edge smooth, white and shining, broadly but slightly scalloped and finely pectinated by about 5 points; joined and rounded into the labium above; much produced angularly and deflected above; produced from the body-whorl at an angle of about 60°. *Labium*, straight, with a slight curve to the right below; on a plane with the labrum above, and slightly lower below. *Umbilicus*, very deep. *Labral lamella*, very sharp and narrow, not covering the umbilicus. *Operculum*, slightly concave, with apparently obsolete bars crossing it horizontally.

Height 0.043, greatest breadth 0.078, least breadth 0.061.

Named in compliment to Robert Fortune, Esq., the celebrated Chinese traveller and collector.

PETITIA ADAMSIANA, Chitty.

Hab. New Hope, Old Hope, and a smaller variety on the road east of the "Water-wheel," Westmoreland.

Form, globose-discoidal. *Colour*, reddish horn. *Sculpture*, 13 very strong spiral carinae, with between the 1st and 2nd and 2nd and 3rd, 1 each rather less strong; between the 3rd and 4th and 4th and 5th, 3 each less strong; between the 5th and 6th, 1 less strong; between the 6th and 7th, 3 less strong; between the 7th and 8th, 1 less strong, and none between the remaining strong carinae. Lines of growth very faint; on the upper whorls, 4 strong carinae with intervening less strong. *Spire*, slightly elevated, with rather convex outlines. *Whorls*, $4\frac{1}{2}$, very slightly rounded and very light suture; last whorl slightly swelling behind the labrum, and slightly constricted at the aperture. *Aperture*, very slightly expanded and scarcely detached from the penult whorl. *Labrum*, appressed to the body-whorl, not produced, much thickened, slightly double below; smooth and simple. *Labium*, much thickened and reflected towards the umbilicus in its centre, slightly curved to the right below; well detached from the body-whorl. *Umbilicus*, moderately deep, covered by an expansion very convex externally of the *labral lamella*, which is much produced immediately after leaving the labrum, and then becomes abruptly narrowed till it joins the body-whorl. In the labral lamella it approaches the subgenus *Agassizia*. *Operculum*, very peculiar, deep concave in the centre and studded with very fine granulations; edge all round very much thickened and folded over in vertical plaits outside, especially at the lower end of the labial

side; throughout the labial side overlapping the labium with sharp, fine, numerous raised lamellæ on the labral side.

Height 0·062, greatest breadth 0·09, least breadth 0·077.

Var. *a*.

From near "Water Wheel."

Height 0·044, greatest breadth 0·076, least breadth 0·061.

Named in honour to the memory of the late Professor C. B. Adams of America, my friend and conchological master.

PETITIA TAYLORIANA, Chitty.

Hab. — ? St. Ann's.

Form, globose-discoid. *Colour*, pale horn. *Sculpture*, 24 fine, sharp, inequidistant, spiral carinæ, 6 of which interspersed are rather strong; on the upper whorls 5. *Spire*, very slightly elevated, with convex outlines. *Whorls*, 4, slightly rounded, with a light suture. *Aperture*, very slightly constricted behind the labrum, and slightly expanding; scarcely detached from the body-whorl; slightly depressed above and expanded below. *Labrum*, white, shortly reflected, not produced above, very little pectinated by the stronger spiral carinæ; slightly double below. *Labium*, on a plane with labrum, straight, appressed above to the body-whorl. *Umbilicus*, rather deep and narrow. *Labral lamella*, scarcely produced. *Operculum*, slightly concave, rather produced at the upper corner of the labial side; smooth, but not shining.

Height 0·033, greatest breadth 0·06, least breadth 0·043.

Named in compliment to T. L. Taylor, Esq., the possessor of a fine collection of shells.

PETITIA STRICKLANDIANA, Chitty.

Hab. Roaring River, Westmoreland.

Form, globose-discoid. *Colour*, rich red-brown. *Sculpture*, lines of growth apparent; 38 inequidistant, irregularly raised, very fine spiral carinæ; on the upper whorls 8. *Spire*, very little elevated, with convex outlines. *Whorls*, 3½, well rounded, with a deep suture. *Aperture*, widely dilated, not constricted, more dilated and depressed below; very slightly detached from body-whorl. *Labrum*, very widely double, moderately produced above, inner and outer edge strongly pectinated and scalloped by 6 points of the spiral carinæ. *Labium*, very little detached from body-whorl, straight above and abruptly curved below to the right; much below the plane of the labrum. *Umbilicus*, deep and rather broad. *Labral lamella*, very little produced. *Operculum*, slightly concave, with fine granulations in the hollow; labral margin with two sharp raised lamellæ round it; a small narrow linguiform point overlapping the labium at the lowest extremity on the labial side.

Height 0·049, greatest breadth 0·074, least breadth 0·055.

Named in compliment to H. E. Strickland, Esq., of Apperley Court, Tewkesbury, a liberal collector.

PETITIA STOKESIANA, Chitty.

Hab. — ? Hanover (unique).

Form, globose-discoid. *Colour*, pale horn. *Sculpture*, lines of growth visible: 4 widely separated, rather strong, slightly raised, rounded spiral carinae; 1 finer; 2nd to 7th strong, and 1 finer close below; 8th strong (the one at the periphery strongest and rather sharp), and 2 very faint, round, and distant from the umbilicus; on the upper whorls 5. *Spire*, very little elevated, with rather concave outlines. *Apex*, somewhat mammiform. *Whorls*, 4, well rounded, with a deep suture. *Aperture*, semicircular, altogether rather depressed, very slightly constricted, not spreading, moderately detached from penult whorl. *Labrum*, scarcely produced above, thickened, slightly reflected; smooth and white, not pectinated. *Labium*, well detached from body-whorl, on a plane with labrum, almost straight within the aperture, white, thickened and expanded towards the umbilicus, much so below, but most so and somewhat pointedly in its centre. *Umbilicus*, broad and deep. *Labral lamella*, much expanded at a distance from its junction with the labrum, becoming very fine as it fades into the umbilicus. *Operculum*, — ?

Height 0.049, greatest breadth 0.08, least breadth 0.061.

Named in compliment to Capt. Lort Stokes, R.N., late of H.M.S. 'Acheron,' a zealous collector.

PETITIA GREVILLEANA, Chitty.

Hab. Yallahs Hill.

Form, globose-discoid. *Colour*, pale horn. *Sculpture*, striae of growth visible; 5 strong spiral carinae, with 5 less strong intervening: on the upper whorls, 2 strong, with the lesser intermediate ones (this might almost be classed in the 2nd division of *Wilkinsonæa*). *Spire*, slightly elevated, with straight outlines. *Whorls*, $3\frac{2}{3}$ rds, well rounded, with a well impressed suture. *Aperture*, obliquely elliptic, more expanded in the upper than lower portion, slightly campanulate on the right owing to a slight constriction behind the labrum. *Labrum*, very slightly produced above, thickened and reflected at about its middle. *Labium*, below the plane of the labrum above, slightly curved to the right below and thickened, slightly detached from body-whorl. *Umbilicus*, not deep, broad. *Labral lamella*, slightly developed. *Operculum*, moderately concave, shining, but with very fine granulations.

Height 0.05, greatest breadth 0.069, least breadth 0.057.

Named in compliment to my friend Dr. R. K. Greville, of Edinburgh.

PETITIA CARPENTERIANA, Chitty.

Hab. Pool's Rock, Hanover.

Form, globose-discoid. *Colour*, — ? *Sculpture*, striae of growth visible: 8 strongest spiral carinae and 1 strong; 5 strongest and 1 strong in each interspace; and 2 stronger round the umbilicus: on the upper whorls 3. *Spire*, much depressed with convex outlines.

Whorls, $3\frac{2}{3}$ rds, moderately rounded, with a deep suture. *Aperture*, semicircular, rather constricted behind the labrum, not expanded, very slightly detached from the body-whorl. *Labrum*, not produced above, smooth, rather double, inner edge sharp, the strongest lines terminating abruptly at the outer edge. *Labium*, very slightly curved to the right below, well detached from the body-whorl, lower than the plane of the labrum below. *Umbilicus*, very shallow and broad, much covered by the *labral lamella*, which is much and widely produced above. *Operculum*, — ?

Height 0.038, greatest breadth 0.07, least breadth 0.054.

Named in compliment to P. P. Carpenter, Esq., of Warrington, author of an excellent Catalogue of the Mazatlan Shells in the British Museum.

PETITIA (? LEWISIA) BARRONIANA, Chitty.

Hab. — ? (unique).

Form, globose-discoidal. *Colour*, — ? *Sculpture*, 20 spiral carinae, 7 of which are rather more prominent, namely the 2nd, 4th, 8th, 12th, 16th, 18th and 19th: on the upper whorls, 6. Striae of growth visible. *Spire*, much depressed, with straight outlines. *Whorls*, 4, moderately rounded, with a light suture. *Aperture*, much constricted at the labrum, semicircular, widely separated from the body-whorl. *Labrum*, not produced above, simple, thin, rather double, slightly and coarsely pectinated on the inner edge, much thickened and slightly reflected. *Labium*, much reflected, moderately curved below, on a plane with the labrum above, lower below. *Umbilicus*, moderately deep, very broad, much concealed by the *labral lamella*, which spreads enormously and suddenly above, exteriorly convex (? *Lewisia*). *Operculum*, very deeply concave in the centre, finely granulated, upper margin broad, and indented on the labral side, and enormously spread convexly over the lower end of the labium; almost equal to the spread of the labral lamella, deeply grooved at the lower end, terminating in a linguiform projection.

Height 0.048, greatest breadth 0.084, least breadth 0.065.

Named in compliment to Charles Barron, Esq., Curator of the Royal Naval Museum, Haslar.

Genus VII. LINDSLEYA.

Shell, globose-conic.

LINDSLEYA LINDSLEYANA, Chitty. See *Stoastoma Lindsleyanum*, Adams. Mon. Stoa. Ad. 1849, p. 12; Cat. Phan. p. 229.

Hab. Manchester back-woods.

LINDSLEYA PICKERINGIANA, Chitty.

Hab. — ? , ? Manchester, ? Yallahs Hill.

Form, globose-conic. *Colour*, very pale horn. *Sculpture*, 17 strong blunted rounded spiral carinae, within each interspace one or rarely two very fine carinae: on the upper whorls 5, with a fine one

in each interspace. *Spire*, well elevated, with straight outlines. *Apex*, rather sharp. *Whorls*, 5, well rounded, with a deep suture. *Aperture*, almost exactly semicircular, rather depressed below. *Labrum*, rather curvilinear in its plane, very slightly produced above, pectinated strongly by the strong carinae. *Labium*, moderately detached from body-whorl, very slightly curved to the right below; on a plane with the labrum above, slightly lower below. *Umbilicus*, moderately deep and broad. *Labral lamella*, produced broadly, but sinking immediately into the umbilicus. *Operculum*, moderately concave, with a rather broad margin, with, on the labral side, 5 or 6 raised lamellae converging towards the umbilicus, the labral side close to its lower extremity bending to the right like the labium, and at its very extremity furnished with a fine linguiform projection which spreads slightly over the labium.

Height 0.086, greatest breadth 0.14, least breadth 0.086.

Named in compliment to John Pickering, Esq., an extensive collector of British shells.

This shell in many respects resembles *L. Lindsleyana*, but is much larger, and its proportions under measurement are very dissimilar; its aperture is wider, and apex much sharper.

LINDSLEYA REDFIELDIANA, Chitty. See *Stoastoma Redfieldianum*, Adams. Mon. Stoas. Ad. 1849, p. 13; Cat. Phan. p. 229.

Hab. Peace River, Manchester.

LINDSLEYA JAYANA, Chitty. See *Stoastoma Jayanum*, Adams. Mon. Stoas. Ad. 1849, p. 14; Cat. Phan. p. 230.

Hab. —? Manchester.

LINDSLEYA LEANA, Chitty. See *Stoastoma Leanum*, Adams. Mon. Ad. Stoas. p. 15; Cat. Phan. p. 229.

Hab. Peace River, Manchester.

LINDSLEYA DENISONIANA, Chitty.

Hab. Moreland, Manchester.

Form, globose-conic. *Colour*, pale horn. *Sculpture*, lines of growth visible: 4 strong spiral carinae and 1 fine; 6th strong, 7th fine; 8th strong, and 9th and 10th fine; 11th strong, 12th to 15th fine; 16th strong, 17th to 19th fine; 20th strong, 21st to 23rd fine; 24th strong, 25th and 26th fine; 27th strong, and 28th to 36th fine; on upper whorls, 5 strong, with fine ones on the intermediate spaces. *Spire*, much and concavely elevated. *Whorls*, $3\frac{3}{4}$, convex, with a well-impressed suture. *Aperture*, more than a semicircle, more angular above than *L. Leana*, very slightly constricted and dilated again slightly, more so below; less campanulate than *L. Leana*; aperture larger and wider above than *L. Leana*. *Labrum* not produced above, continuous all round with labium, sharply and slightly reflected at rather more than a right angle, with a ridge on the inner side, very slightly pectinated by about ten points of the

strong spiral carinæ, not thickened as in *L. Leana*; rather double below. *Labium*, on a plane with labrum, more closely appressed to body-whorl above. *Umbilicus*, narrow, much deeper and wider than in *L. Leana*. *Labral lamella*, very slightly developed. *Operculum*, —?

Height 0·06, greatest breadth 0·074, least breadth 0·056.

Named in compliment to John Denison, Esq., well known for his extensive collection of shells.

LINDSLEYA POLYBLANKIANA, Chitty.

Hab. —? Westmoreland.

Form, globose-conic. *Colour*, light red-brown. *Sculpture*, an uncountable number, say 50, extremely fine, raised, wavy, well-defined spiral carinæ; about 20 on the upper whorls. *Spire*, well elevated, with convex outlines. *Apex*, acute. *Whorls*, $4\frac{1}{4}$, quite round, with a very deep suture. *Aperture*, subelliptical, rather flattened above and broad spreading, narrowed below and rather straightened on the labial side, not in the least degree angular above or below; labrum and labium continuous, much reflected. *Labrum*, excessively double, especially above, where the outer stands clear out from the inner edge. *Labium*, much reflected and closely attached to body-whorl, very little straightened. *Umbilicus*, deep and narrow. *Labral lamella*, very fine and narrow, lost immediately in the umbilicus. *Operculum*, —?

Height 0·069, greatest breadth 0·071, least breadth 0·056.

Named in compliment to George Polyblank, Esq., a liberal amateur collector.

LINDSLEYA ALBERSIANA, Chitty.

Hab. John Crow Hill, Portland.

Form, globose-conic. *Colour*, pale yellow. *Sculpture*, 25 fine spiral carinæ; on the upper whorls 9 or 10. *Spire*, well elevated, with rather convex outlines. *Whorls*, 5, well rounded, with a deep suture. *Aperture*, subelliptical, labrum and labium being continuous; white, smooth; slightly expanded and deflected below, very slightly detached from body-whorl, and almost vertical. *Labrum*, double; smooth, white, not affected by the spiral carinæ; continuous with the labium. *Labium*, moderately detached from body-whorl. *Umbilicus*, moderately deep, not affected by the *labral lamella*, which is very little produced. *Operculum*, moderately concave, smooth and shining.

Height 0·049, greatest breadth 0·063, least breadth 0·044.

Named in compliment to Dr. J. C. Albers, of Berlin.

This shell is like *L. Arthuriana*, but differs materially in sculpture, number of whorls, and measurement.

LINDSLEYA FISCHERIANA, Chitty.

Hab. —? St. Ann's.

Form, globose-conic. *Colour*, pale yellow. *Sculpture*, 6 strong spiral carinæ, with 1 fine in the interspaces; then 3 fine and 1 strong;

then 1 fine and 5 strong, with 1 fine in the interspaces; then 3 fine and 1 strong and 1 fine and 1 strong; on the upper whorls 5 strong and 1 fine in each interspace. *Spire*, well elevated with straight outlines. *Whorls*, $4\frac{2}{3}$ rds, well rounded, with a deep suture. *Aperture*, very slightly expanded and depressed, scarcely separated from the body-whorl, semicircular. *Labrum*, white, shining, very slightly produced above, very slightly double, largely pectinated by 11 points of the strong carinae. *Labium*, slightly detached from the body-whorl, upper three-fourths straight, rather abruptly curving to the right below; on a plane with labrum. *Umbilicus*, deep and narrow. *Labral lamella*, strong, wide and sharp, projecting in an angular point a little below its junction with labrum. *Operculum*, —?

Height 0.072, greatest breadth 0.086, least breadth 0.072.

Named in compliment to M. Paul Fischer, the well-known French conchologist.

LINDSLEYA MORICANDIANA, Chitty. See *Stoastoma Moricandianum*, Adams, Cont. Conch. p. 150; Cat. Phan. p. 230.

Hab. Yallahs Hill?

LINDSLEYA REEVEANA, Chitty.

Hab. The borders of Manchester, Trelawny and St. Ann's.

Colour, pale horn. *Sculpture*, 7 strong spiral carinae, those about the periphery being more distantly apart, with in each interspace 3 finer carinae; on the upper whorls 4 strong carinae: almost obsolete behind the labrum. Striae of growth slightly visible. *Spire*, well elevated, with slightly convex outlines. *Whorls*, 4, well rounded, with a deep suture; last whorl well rounded and very globose. *Aperture*, peculiar and very large and spreading, considerably constricted far behind the labrum, very much expanding again like the half of the bowl of a spoon; subangular above and below on the left, depressed above, well dilated on the right below, widest horizontally, flattened below. *Labrum*, at about $\frac{1}{3}$ rd of the length of the constriction, attached to the body-whorl, in, as it were, a curvilinear opening of about 35° ; the spiral carinae at the back almost obsolete and striae of growth stronger; double, the outer edge pectinated by 7 points of the stronger carinae and scalloped; inner edge much thickened, pectinated by about 4 points, much produced and deflected above, modifying the aperture. *Labium*, appressed in its upper end to the penult whorl, straight above, slightly curved to the right below, very much below the plane of the labrum. *Umbilicus*, rather deep and very narrow. *Labral lamella*, very finely produced. *Operculum*, well thickened on the labial side, very slightly concave and smooth.

Height 0.061, greatest breadth 0.073, least breadth 0.061.

Named in compliment to Lovell Reeve, Esq., the able conchologist.

LINDSLEYA SHUTTLEWORTHIANA, Chitty.

Hab. Burnt Hill Glade, Westmoreland (unique).

Form, globose-conic. *Colour*, —? *Sculpture*, striae of growth

very visible, oblique; about 16 strong sharp spiral carinæ, stronger below, with one faint finer in each interspace; on upper whorls 5 strong, with finer intervening. *Spire*, slightly and rather concavely elevated. *Whorls*, 5, moderately convex, with a deep suture; last whorl large and spreading behind the labrum, but, on the left, assimilating the form of the subgenus *Metcalfeia*, and rather falling off below. *Aperture*, semicircular, except as modified by the labium; very slightly spreading. *Labrum*, thin, slightly reflected, pectinated by about 10 points, 4 fine and close on the upper part, 6 strong and wide apart round the periphery, strongest at the periphery; above, moderately produced from the body-whorl in a graceful curve. *Labium*, well detached from the body-whorl, curved throughout, below the plane of the labrum at lower end, thickened and reflected towards the umbilicus. *Umbilicus*, deep and narrow. *Labral lamella*, very slightly produced and immediately merged in the umbilicus. *Operculum*, — ?

Height 0·072, greatest breadth 0·12, least breadth 0·084.

Named in compliment to Robert Shuttleworth, Esq., of Berne, the well-known botanical and conchological collector and author.

LINDSLEYA BOISSIERIANA, Chitty.

Hab. New Forest, Manchester.

Form, globose-conic. *Colour*, pale horn. *Sculpture*, striæ of growth visible: 12 prominent not very strong spiral carinæ, with between the 1st and 2nd, 2 finer carinæ; between 2nd and 3rd and 3rd and 4th, 1 fine; between 4th and 12th, 2 fine; beyond the 12th, 5 or 6 very, fine round the umbilicus: on the upper whorls 5 strong, with intermediate fine. *Spire*, well elevated, with slightly convex outlines. *Whorls*, 5, well rounded, with a deep suture. *Aperture*, more than a semicircle, moderately expanded and slightly deflected below. *Labrum*, but slightly separated or produced from the body-whorl, well pectinated by the strong carinæ. *Labium*, slightly detached from body-whorl, on a plane with labrum above; slightly lower below, moderately curved to the right. *Umbilicus*, deep and narrow. *Labral lamella*, rather produced at junction with labrum, narrow below. *Operculum*, slightly concave, five horizontal lamellæ across it, strongest in the middle, fine granulations, a linguiform sharp projection overlapping the labium.

Height 0·064, greatest breadth 0·083, least breadth 0·067.

Named in compliment to M. Edward Boissier, of Geneva, the eminent naturalist.

LINDSLEYA GASKOINIANA, Chitty.

Hab. Near Ashley Hall, Trelawny.

Form, globose-conic. *Colour*, white. *Sculpture*, 14 strong spiral carinæ, with 2 fine in each interspace; on the upper whorls 5, with fine ones intervening. *Spire*, well elevated, with straight outlines. *Whorls*, $4\frac{1}{2}$, with a moderate suture. *Aperture*, more than a semicircle, subelliptical. *Labrum*, detached from the body-whorl, produced moderately above, very strongly pectinated by about 13 points,

slightly expanded, reflected, and depressed below. *Labium*, slightly detached from the body-whorl, curved to the left above, and more so to the right below. *Umbilicus*, shallow and narrow, partially hidden by the gracefully curved but slightly projecting *labral lamella*. *Operculum*, very slightly concave, with a few coarse granulations, overlapping the labium on the labial side.

Height 0.064, greatest breadth 0.084, least breadth 0.064.

Named in compliment to J. S. Gaskoin, Esq., a lover of and writer on conchology.

LINDSLEYA NEWCOMBIANA, Chitty.

Hab. Clarendon Mountains (damaged, unique).

Form, globose-conic. *Colour*, —? *Sculpture*, 18 strong rounded spiral carinae, with 2 finer intervening at the periphery; on the upper whorls 5. Striae of growth visible. *Spire*, well-elevated, with rather concave outlines. *Whorls*, 5, moderately rounded, with a well-impressed suture. *Aperture*, semicircular, scarcely detached from body-whorl, not expanded or depressed, except slightly below. *Labrum*, very little produced above, pectinated by all the strong lines. *Labium*, well-detached from body-whorl, slightly curved below, on a plane with labrum above, lower below. *Umbilicus*, deep and narrow. *Labral lamella*, slightly and evenly produced. *Operculum*, —?

Height 0.08, greatest breadth 0.1, least breadth 0.081.

Named in compliment to Dr. Newcomb, of Albany, N. Y.

LINDSLEYA RIISEANA, Chitty.

Hab. Near Mr. Channer's, Santa Cruz Park, St. Elizabeth (unique).

Form, globose-conic. *Colour*, pale yellow. *Sculpture*, 13 sharp spiral carinae with 1 finer in each interspace; on the upper whorls 3 strong with fine intervening. *Spire*, well-elevated, with straight or very slightly concave outlines. *Whorls*, $4\frac{1}{2}$, very much rounded, with a deep suture; last whorl large. *Aperture*, sub-semielliptical, slightly expanded, rather flattened above and expanded below. *Labrum*, double, white, thickened, slightly scalloped and pectinated by 8 points, continuous with the labium, very slightly produced above. *Labium*, well-detached from body-whorl, continuous with labrum, much curved, more so below, very slightly lower than plane of the labrum below. *Umbilicus*, moderately deep and broad. *Labral lamella*, very slightly produced. *Operculum*, —?

Height 0.049, greatest breadth 0.067, least breadth 0.05.

Named in compliment to A. H. Riise, Esq., of the Island of St. Thomas, a scientific conchologist.

LINDSLEYA POEYANA, Chitty.

Hab. John Crow Hill, Portland.

Form, globose-conic. *Colour*, pale horn, almost white at the aperture. *Sculpture*, about 18 strong spiral carinae, with here and No. CCCXXXIX.—PROCEEDINGS OF THE ZOOLOGICAL SOCIETY.

there 1 fine carina intervening, rather inequidistant; on the upper whorls 4. *Spire*, well-elevated, with straight outlines. *Whorls*, $4\frac{3}{4}$, scarcely convex, with a very light suture. *Aperture*, larger than semicircular, rather flattened above, moderately expanded, much on the right below. *Labrum*, slightly double and very little pectinated by the carinae, produced above and much reflected, scarcely detached from body-whorl. *Labium*, little detached from body-whorl, straight, except the curve to the right below; very little below the plane of labrum in the lower part. *Umbilicus*, moderately deep. *Labral lamella*, very little produced. *Operculum*, concave, minutely granulated.

Height 0·077, greatest breadth 0·11, least breadth 0·078.

Named in compliment to M. Felipe Poeey, now of the Havanna.

LINDSLEYA HENRYANA, Chitty.

Hab. Pool's Rock and Halley's Mountain, Hanover.

Form, globose-conic. *Colour*, pale horn. *Sculpture*, 18 blunt coarse spiral carinae, with 1 very fine (about the periphery) intervening; on the upper whorls 7. *Spire*, well-elevated, with straight outlines. *Whorls*, $4\frac{1}{2}$, well-rounded, with deep suture. *Aperture*, very slightly expanded, more than a semicircle, spreading above and below, very slightly detached from the body-whorl. *Labrum*, thin and smooth, pectinated by about 10 points outwards, scarcely produced above. *Labium*, moderately detached from body-whorl, thin, curved to the right below, on a plane with the labrum above, rather lower below. *Umbilicus*, rather broad, and suddenly very deep. *Labral lamella*, considerably produced, more expanded above; within the umbilicus, and higher up the outside of the labium is another lamella, almost as strong as the labral lamella. *Operculum*, slightly concave, with about 12 very coarse granulations on the labral lower side.

Height 0·053, greatest breadth 0·067, least breadth 0·054.

Named in compliment to Henry Adams, Esq., of London, the conjoint author with his brother Arthur Adams.

LINDSLEYA ALDERIANA, Chitty.

Hab. John Crow Hill, Portland.

Form, globose-conic. *Colour*, pale yellowish horn. *Sculpture*, striae of growth visible; 17 strong spiral carinae, with 1 fine in each interspace, 3 fine intervening at the periphery, where the strong carinae are wide apart; on the upper whorls 3, with finer intervening. *Spire*, well-elevated, with slightly concave outlines. *Whorls*, nearly 5, moderately convex, with a moderate suture. *Aperture*, semicircular, slightly expanded below. *Labrum*, slightly produced above, rather reflected, scarcely detached from the penult whorl, rather strongly pectinated by about 11 of the spiral carinae. *Labium*, very slightly curved to the right, else almost straight, moderately detached from the body-whorl, rather below the plane of the labrum. *Umbilicus*, very deep. *Labral lamella*, slightly produced. *Oper-*

culum, slightly concave, crossed horizontally by 5 lamellæ, labial side plaited vertically.

Height 0·068, greatest breadth 0·086, least breadth 0·073.

Named in compliment to Josiah Alder, Esq., of Newcastle.

LINDSLEYA BRIDGESIANA, Chitty.

Hab. Bodle's Pen Wood (high road to Clarendon), St. Dorothy.

Form, globose-conic. *Colour*, very pale horn. *Sculpture*, 19 strongly raised spiral carinæ; on the upper whorls 6. *Spire*, moderately elevated, with rather concave outlines. *Whorls*, $4\frac{3}{4}$, moderately rounded, with a moderate suture. *Aperture*, semicircular, very slightly expanded above, more so below. *Labrum*, scarcely detached from body-whorl, slightly produced above, pectinated and scalloped bluntly by about 15 of the carinæ. *Labium*, straight, except a slight curve below; moderately detached from the body-whorl, rather below the plane of the labrum in lower end. *Umbilicus*, deep. *Labral lamella*, rather produced at its junction with the labrum, moderately broad round the umbilicus. *Operculum*, moderately concave, a very few coarse granulations, with 8 or 10 very short raised lamellæ converging to, but not reaching, the centre, on the labral side; a linguiform sharp projection overlapping the lower extremity of the labium.

Height 0·06, greatest breadth 0·076, least breadth 0·063.

Named in compliment to Thomas Bridges, Esq., an able zoological and botanical collector, particularly in Chili and other parts of South America.

LINDSLEYA SALLÉANA, Chitty.

Hab. New Forest, Manchester (unique).

Form, globose-conic. *Colour*, — ? *Sculpture*, 12 strong spiral carinæ, 2 fine in each interspace and 3 less strong round the umbilicus: on the upper whorls 4 corresponding fine ones. *Spire*, well-elevated, with rather concave outlines. *Whorls*, $4\frac{3}{4}$, well-rounded, with a deep suture. *Aperture*, slightly expanded above, more so below, scarcely detached from last whorl, more than a semicircle. *Labrum*, scarcely produced from body-whorl, not produced above, very slightly reflexed and thickened, coarsely pectinated by the strong carinæ. *Labium*, moderately detached from body-whorl, slightly curved throughout, on a plane with labrum. *Umbilicus*, broad and moderately deep. *Labral lamella*, much produced at its junction with labrum, below, sharp, and dipping abruptly into the umbilicus. *Operculum*, — ?

Height 0·079, greatest breadth 0·092, least breadth 0·073.

Named in compliment to M. Auguste Sallé, an excellent zoological collector.

LINDSLEYA ARTHURIANA, Chitty.

Hab. John Crow Hill, Portland.

Form, globose-conic. *Colour*, light yellow. *Sculpture*, 31 raised spiral carinæ, not quite equidistant; on the upper whorls 7. *Spire*,

well-elevated, with rather convex outlines. *Whorls*, $3\frac{2}{3}$ rds, very well rounded, with a deep suture, last whorl very globose. *Aperture*, slightly and somewhat abruptly expanded, more than a semicircle, subelliptical, slightly depressed above and expanded below. *Labrum*, rounded into labium, more broadly below, very slightly produced above, double, white, smooth, not pectinated. *Labium*, scarcely detached from body-whorl, on a plane with labrum. *Umbilicus*, very shallow, broad. *Labral lamella*, scarcely produced. *Operculum*, slightly concave, very finely granulated in the centre.

Height 0.049, greatest breadth 0.066, least breadth 0.054.

Named in compliment to Arthur Adams, Esq., of London, the conjoint author with his brother Henry Adams.

This shell is like *L. Albersiana*, but differs in sculpture, number of whorls and measurements.

LINDSLEYA GUTIEREZIANA, Chitty.

Hab. New Hope, Westmoreland.

Form, globose-conic. *Colour*, pale horn. *Sculpture*, 16 strong spiral carinæ, only about the periphery one fine intervening; on the upper whorls, 5. *Spire*, well-elevated, with straight outlines. *Whorls*, $5\frac{1}{2}$, well-rounded, with a deep suture. *Aperture*, less than a semicircle, very slightly spreading, and very slightly deflected below. *Labrum*, slightly separated from body-whorl, rather produced above, in a broad notch, pectinated by about 15 of the strong carinæ. *Labium*, well-detached from body-whorl, curved inwards, more so below; thickened and reflected in the centre and its lower end towards the umbilicus. *Labrum* and *labium* continuous above; *labium* on a plane with labrum below. *Umbilicus*, deep. *Labral lamella*, sharply produced as it leaves the labrum, becoming narrow and abruptly lost in the umbilicus. *Operculum*, —?

Height 0.084, greatest breadth 0.15, least breadth 0.082.

Named in compliment to Señor Don Nicolas José Gutierrez, Curator of the Museum at the Havanna.

LINDSLEYA OWENIANA, Chitty.

Hab. Yallah's Hill.

Form, globose-conic. *Colour*, pale horn. *Sculpture*, 19 strong, rather inequidistant spiral carinæ; on the upper whorls 6. Striæ of growth visible. *Spire*, moderately elevated, with rather concave outlines. *Whorls*, $4\frac{1}{2}$, well-rounded, with a deep suture. *Aperture*, semicircular, rather flattened above, slightly expanded in the lower two-thirds. *Labrum*, rather produced above, not reflected, thin, strongly pectinated by spiral carinæ. *Labium*, rather detached from body-whorl, gradually curved to the right below. *Umbilicus*, rather deep and broad, slightly hidden by the *labral lamella*, which is but little produced. *Operculum*, concave, finely granulated, with, on the labral side extending half across, 5 horizontal raised lamellæ converging towards the umbilicus, the margins of which are covered with fine granulations giving the appearance of serration; lower

third laps tightly over the labium, grooved horizontally, and then finished by a linguiform, raised, folding projection.

Height 0·069, greatest breadth 0·094, least breadth 0·073.

Named in compliment to Professor Owen.

LINDSLEYA WOLLASTONIANA, Chitty.

Hab. — ? Hanover.

Form, globose-discoidal. *Colour*, white, semitransparent. *Sculpture*, about 31 very fine inequidistant irregular spiral raised carinæ, about 8 rather stronger than the rest; on the upper whorls 8. *Spire*, slightly raised, with convex outlines. *Whorls*, $3\frac{3}{4}$, very moderately rounded, with a light suture. *Aperture*, slightly constricted behind labrum, and then slightly expanded, semicircular. *Labrum*, very little produced above, thickened and reflected and very slightly pectinated by the stronger carinæ. *Labium*, well-detached from the body-whorl, moderately curved below, on a plane with the labrum. *Umbilicus*, moderately deep and wide. *Labral lamella*, narrow and sharp. *Operculum*, slightly concave, plain and smooth, except a few coarse granulations.

Height 0·036, greatest breadth 0·064, least breadth 0·05.

Named in compliment to T. Vernon Wollaston, Esq., M.A., so well known for his Natural History researches in Madeira.

Genus VIII. BLANDIA, Chitty.

Shell subdiscoidal, not prominently sculptured.

BLANDIA BLANDIANA, Chitty.

See *Stoastoma Blandianum*, Ad. Mon. Stoa. Adams, 1849, p. 6; Cat. Phan. p. 234.

Hab. Peace River, Manchester.

BLANDIA JEFFREYSIANA, Chitty.

Hab. Roaring River, Westmoreland.

Form, subdiscoidal. *Colour*, pale yellow. *Sculpture*, 22 fine distant and nearly equidistant spiral carinæ, 5 interspersed being rather stronger; carinæ, finer behind the aperture: on the upper whorls 6. *Spire*, very little elevated, with convex outlines. *Whorls*, $3\frac{1}{2}$, moderately rounded, with a light suture. *Aperture*, constricted at a distance behind labrum, and widely expanded and cupping inwards at the labium, rather flattened above. *Labrum*, moderately produced above, treble in the upper part, broadly but not deeply scalloped, and pectinated by the 5 stronger carinæ, much thickened, white and shining. *Labium*, thickened and much reflected to the left at its edge, curved to the right below, widely detached from body-whorl, much below the plane of labrum. *Umbilicus*, very deep and broad. *Labral lamella*, rather strong. *Operculum*, very concave, margined with a broad convexly raised ridge something like *Wilk. Schomburgiana*, with two deep plainly visible indented grooves on

the labial side; 5 sharp diagonal raised lines crossing from right above to left below on the labral side of the hollow.

Height 0.04, greatest breadth 0.063, least breadth 0.047.

Named in compliment to J. Gwyn Jeffreys, Esq., late of Swansea, now of London, a zealous conchologist and possessor of the finest British collection.

BLANDIA BAIRDIANA, Chitty.

Hab. Yallah's Hill.

Form, subdiscoidal. *Colour*, very pale horn or pure white. *Sculpture*, about 30 or 40 spiral carinæ, almost obsolete, scarcely visible under a $1\frac{1}{4}$ -inch microscope, about 5 being rather more sharp than the rest; on the upper whorls about 7. *Spire*, very slightly elevated, with rather concave outlines. *Whorls*, $3\frac{1}{3}$, moderately rounded, with a light suture: last whorl rather flattened at the periphery. *Aperture*, semielliptical, very much produced from the body-whorl, rather depressed above, but elegantly expanded throughout. *Labrum*, very much produced above, joining the body-whorl in a very graceful serpentine curving lamella, (by which the shell may be distinguished,) much thickened and reflected. *Labium*, moderately detached from the body-whorl and thickened and reflected, slightly curved to the right below, very much below the plane of the labrum. *Umbilicus*, broad and moderately deep. *Labral lamella*, very sharp and narrowly produced. *Operculum*, deep concave, apparently smooth, or with blunt vertical lamellæ, margined all round, labial side much curved, rather pointed at upper and lower extremity.

Height 0.033, greatest breadth 0.062, least breadth 0.052.

Named in compliment to my friend Dr. Baird, of the British Museum.

Var. Minor. A much smaller variety, coming from the same habitat.

BLANDIA MACGILLIVRAYANA, Chitty.

Hab. (?) Pedro district, St. Ann's.

Form, subdiscoidal. *Colour*, pale yellow. *Sculpture*, 20 faint equidistant spiral carinæ; on the upper whorls, 6. *Spire*, very little elevated, with convex outlines. *Whorls*, $3\frac{1}{4}$, moderately rounded with a moderate suture. *Aperture*, large, very broadly expanding, slightly depressed above. *Labrum*, double throughout, but more so above, slightly reflected, white, smooth, much produced above, leaving the body-whorl at an angle of about 50° . *Labium*, almost appressed to the body-whorl in its centre, slightly curved above, more below to the right, below the plane of the labrum. *Umbilicus*, shallow and spreading. *Labral lamella*, very little produced. *Operculum*, not concave, but moderately sunk or depressed (flat or smooth) in its interior surface, more so at the lower labial side; edge on labral side much and broadly folded over convexly.

Height 0.034, greatest breadth 0.055, least breadth 0.045.

Named in compliment to John MacGillivray, Esq., the well-known and able naturalist and collector.

BLANDIA TROSCHELIANA, Chitty.

Hab. Clarendon Mountains.

Form, subdiscoidal. *Colour*, — ? (only two bad specimens). *Sculpture*, 23 irregular inequidistant coarsely rounded spiral carinae obsolete at the periphery, 4 more prominent than the rest; on the upper whorls, 5. *Spire*, much depressed, with convex outlines. *Whorls*, $3\frac{1}{2}$, well-rounded, with a well-impressed suture. *Aperture*, very slightly expanded, rather flattened above and depressed below, more than a semicircle. *Labrum*, moderately produced above, double, white, thickened and reflected, very slightly pectinated by the four stronger carinae, or rather squared as in *Wilkinsonæa Moussoniana*. *Labium*, well-detached from body-whorl, slightly curved to the right above and below, on a plane with the labrum below, lower above. *Umbilicus*, broad and deep. *Labral lamella*, very little produced. *Operculum*, smooth and concave, deep on the labial side.

Height 0·03, greatest breadth 0·059, least breadth 0·045.

Named in compliment to Dr. Troschel, of Bonn, Editor of the 'Archiv' of Natural History, &c.

BLANDIA HILLIANA, Chitty.

Hab. — ? , Westmoreland.

Form, subdiscoidal. *Colour*, pale horn. *Sculpture*, 22 inequidistant spiral carinae, wider apart and stronger above, and a few at the periphery most raised; on the upper whorls, 5. *Spire*, much depressed, slightly concave. *Whorls*, $3\frac{1}{2}$, moderately rounded, with a rather deep suture. *Aperture*, very slightly constricted at the fauces, slightly expanded, depressed above, more than a semicircle. *Labrum*, well-produced above and pointedly, leaving the body-whorl at about an angle of 30° , white, slightly pectinated by about five points, thin, reflected. *Labium*, slightly curved below, well-detached from body-whorl. *Umbilicus*, rather deep and broad. *Labral lamella* and *operculum*, like *Wilkinsonæa Bensoniana*.

Height 0·025, greatest breadth 0·047, least breadth 0·041.

Named in compliment to the Hon. Richard Hill, of Spanish Town, Jamaica, well-known as an ornithologist and lover of general natural history.

BLANDIA TRAILLIANA, Chitty.

Hab. Clarendon Mountains (unique).

Form, subdiscoidal. *Colour*, pale horn. *Sculpture*, 5 coarser spiral carinae and 2 coarse; 6th to 10th coarse, with one coarse between, and after each, 11th coarser, and 5 coarse, round umbilicus; on the upper whorls, 5. *Spire*, much depressed, with convex outlines. *Whorls*, $3\frac{1}{2}$, well-rounded, with a deep suture; last whorl well-rounded, large. *Aperture*, semicircular, slightly constricted at

a distance from the labrum, and then elegantly and slightly expanded. *Labrum*, well, and in an elegant curve, produced above, treble above and double below, as in *Helix Rupis-fontis* in my cabinet (N.B. since first describing this shell it has unfortunately got broken), very slightly thickened at its extreme edge, and white. *Labium*, moderately detached from body-whorl, wide and much reflected, curving slightly throughout, below the plane of labrum. *Umbilicus*, moderately deep and broad. *Labral lamella*, slightly produced. *Operculum*, — ?

Height 0.034, greatest breadth 0.057, least breadth 0.041.

Named in compliment to Dr. Traill (Malacca?), the great East Indian collector.

BLANDIA LUKISIANA, Chitty.

Hab. Near Port Maria (unique).

Form, subdiscoidal. *Colour*, pale horn. *Sculpture*, 27 fine sharp spiral carinæ, the 6th, 10th, 15th, and 23rd being rather stronger; on the upper whorls, 6. *Spire*, much depressed, with slightly convex outlines. *Whorls*, 3½rd, moderately rounded, with a moderate suture. *Aperture*, slightly depressed above, expanded below, semi-elliptic. *Labrum*, produced above in a curve, leaving the body-whorl in a quasi angle of about 80°, double and widely so above, pectinated by about 5 points, very slightly reflected, white. *Labium*, nearly straight, very little curved to the right below, slightly detached from the body-whorl, on a plane with the labrum above, lower below. *Umbilicus*, moderately deep. *Labral lamella*, rather produced in its centre. *Operculum*, — ?

Height 0.024, greatest breadth 0.051, least breadth 0.04.

Named in compliment to Dr. Lukis of Guernsey, an able naturalist and antiquary.

BLANDIA LOWEANA, Chitty.

Hab. Bodle's Pen Wood, St. Dorothy.

Form, subdiscoidal. *Colour*, dark horn. *Sculpture*, spiral carinæ, 5 less and 1 strong repeated four times, then 5 less and 2 strong, then 3 fine and 1 strong, and 4 less strong; on the upper whorls, 7 or 8. *Spire*, very slightly elevated, with slightly concave outlines. *Apex*, obtusely prominent. *Whorls*, 3½, very slightly rounded, with a deep suture. *Aperture*, more than a semicircle, rather expanded above, very slightly deflected and expanded below. *Labrum*, slightly produced above at the 1st and 2nd strong carinæ, broadly pectinated and scalloped by all the strong carinæ. *Labium*, well-detached from the body-whorl, below the plane of the labrum above, slightly rounded and nearly up to the plane of the labrum in the lower end. *Umbilicus*, moderately deep. *Labral lamella*, very sharp and narrow. *Operculum*, deeply concave in the centre and minutely granulated; two or three microscopic lamellæ crossing vertically, the edge all round thickened and deeply reflected outward, the upper edge having five or six deep irregular vertical folds.

Height 0.027, greatest breadth 0.055, least breadth 0.042.

Named in compliment to the Rev. R. T. Lowe, lately Chaplain in Madeira, and the well-known contributor to the natural history of that island.

2. LIST OF ADDITIONAL SPECIES OF MEXICAN BIRDS, OBTAINED BY M. AUGUSTE SALLÉ FROM THE ENVIRONS OF JALAPA AND S. ANDRES TUXTLA. BY PHILIP LUTLEY SCLATER, M.A.

M. Auguste Sallé, since his return from Southern Mexico (where he made the very extensive collection of birds, of which I gave an account in these Proceedings for last year), has received in Paris a considerable number of specimens procured by some of his correspondents in the same part of the country. Among them are many species of which he did not himself obtain examples. These he has been kind enough to send over for my inspection, and I have thus been enabled to form an additional List of upwards of sixty species of birds found in this part of Mexico, which were not included in my former catalogue. The majority of these were obtained in the environs of Jalapa and S. Andres Tuxtla, both of which places are within the confines of the State of Vera Cruz.

1. *SPIZAETUS ORNATUS* (Daud.).

Jalapa.

2. *HERPETOTHERES CACHINNANS* (L.).

Jalapa.

3. *ASTURINA NITIDA* (Lath.).

Jalapa.

4. *ELANUS LEUCURUS* (Vieill.).

Jalapa.

5. *ATHENE HYPOGÆA*, Bp., Cassin, B. Cal. p. 188.

Jalapa.

6. *PETROCHELIDON BICOLOR* (Vieill.).

S. José.

7. *PROGNE DOMINICENSIS* (Gm.).

S. Andres Tuxtla.

8. *MOMOTUS CÆRULEICEPS*, Gould.

Jalapa.

9. *HYLOMANES MOMOTULA*, Licht. Abh. Ac. Berol. 1838, p. 449, pl. 4.

Jalapa.

10. CERYLE TORQUATA (Linn.).

Jalapa.

11. CERYLE AMAZONA (Lath.).

Jalapa.

Agrees with S. A. examples.

12. XIPHOCOLAPTES ALBICOLLIS (Vieill.)?

A fine bird of the section of *Dendrocolaptinae* which embraces the larger species (*albicollis*, *major*, *promeropirhynchus*, &c.), is in M. Sallé's collection from the vicinity of Jalapa. It is the first of the genus that I have seen from the country northward of Panama, and a full series of specimens would possibly show that it was different from the S. A. *X. albicollis*, to which I have referred it provisionally. Lafresnaye, in his 'Monograph,' has employed the name *Dendrocolaptes* for this section, but that name is rightly applicable to the *D. cayanaensis* and its affines, for which he has used the generic term *Dendrocops*.

13. RHAMPHOCÆNUS RUFIVENTRIS (Bp.), Gray's Gen. pl. 47. f. 2.

S. Andres Tuxtla.

14. RHIMAMPHUS ÆSTIVUS (Lath.).

Jalapa and S. Andres Tuxtla.

15. SYLVICOLA AMERICANA (Linn.), Wilson's Am. Orn. pl. 28. f. 3.

Tlacotalpam.

I am rather surprised to find this bird so far to the south. I should rather have expected to see its Central American representative *S. mexicana* (Bp. Consp. p. 310).

16. BASILEUTERUS CHRYSOPHRYS, Bp. Consp. p. 314.

Olivaceo-viridis: gutture et corpore medio subtus flavis: lateribus olivaceis: pileo et capitis lateribus intense castaneis: superciliis latis et longis, aureis: fronte et superciliarum marginibus superioribus nigris: rostro nigro: pedibus pallide flavis.

Long. tota 5·0, alæ 2·3, caudæ 2·1.

This very pretty species of *Basileuterus* is shortly characterized by Prince Bonaparte in his 'Conspectus' from the specimen in the Berlin Museum. M. Sallé's examples were obtained in the vicinity of Jalapa.

17. REGULUS CALENDULA (L.), Wils. Am. Orn. pl. 5. f. 3.

Jalapa.

18. TURDUS ASSIMILIS, Cab. Mus. Hein. p. 4.

Jalapa and Vigia.

This fine Thrush is very closely allied to a well-known S. Ame-

rican species *T. crotopezus*, Licht. (*T. albicollis*, Spix). The under surfaces of these two birds are very nearly alike — *Turdus assimilis* showing only rather a larger white patch on the neck and deeper cinereous breast; but above *T. crotopezus* is of a rich umber-brown colouring, and the tail of a bluish-grey; whereas in the Mexican species the whole upper surface is of a paler and more cinereous brown. I have seen examples of this bird also from Orizaba and Puente Nacional in Mexico and from Guatemala.

19. MALACOCICHLA MEXICANA, Bp. Compt. Rend. t. xliii. Nov. 1846.

Jalapa.

20. THAMNOPHILUS MELANURUS, Gould, P. Z. S. 1855, p. 69. pl. 83.

Santecomapam.

I have already recorded the appearance of this species in Chiriqui (P. Z. S. 1856, p. 142); but I was not prepared to find it so far north.

21. TODIROSTRUM CINEREUM (Linn.), *antea*, p. 83.

Tlacotalpam, March 1856.

22. CAMPTOSTOMA IMBERBE, sp. nov.

Genus novum Tyrannidarum, Tyrannulo affine: rostrum altum, breve, valde compressum, apice acuta et dente finali nulla; culmine multum arcuato et regulariter incurvo, gonyde paulum ascendente; vibrissis rictalibus nullis: alæ modicæ, dimidium caudæ attingentes; primariis secunda, tertia et quarta inter se æqualibus et quintam paulo excedentibus, sexta his paulo brevior sed primam superante: cauda modica quadrata: tarsi breviusculi: pedes ut in genere Tyrannulo.



C. IMBERBE, sp. nov.

C. supra olivascens-fuscum, pileo semicristato, cinerascens-fusco; alis fuscis, secundariarum et tectricum marginibus externis pallidioribus et albicantibus; cauda pallide cinerascens-fusco unicolore: subtus cinerascens-albidum flavo perfusum: rostri nigri mandibula inferiore basi flavicante; pedibus nigris.

Long. tota 3·5; alæ 2·8; caudæ 1·3.

Hab. In vicinitate urbis S. Andres Tuxtla in rep. Mexicana.

M. Sallé's recent collections contain a single specimen of this curious little bird, which was obtained in the neighbourhood of S. Andres Tuxtla. There is no doubt about its belonging to the *Tyrannidae*, but the form of the bill appears to be quite different from that of any bird hitherto recognized as of that family, and to require a new generic appellation. I have therefore called it *Camptostoma* from the arched form of the culmen. The specific name *imberbe* refers to the entire absence of rictal bristles. I consider *Tyrannulus* to be perhaps its nearest-allied generic form, from which, however, it may be at once distinguished by the peculiar depth and compression of the bill. Dr. Hartlaub's *Ornithion inerme* belongs, I suspect, to this same section of *Tyrannidae*.

23. SAYORNIS PALLIDA (Sw.), *antea*, p. 127.

Jalapa.

24. MILVULUS FORFICATUS (Gm.), Bp. Am. Orn. pl. 2. f. 1.

Jalapa.

25. SCAPHORHYNCHUS MEXICANUS, Lafr. R. Z. 1851, p. 473.

Jalapa.

26. PACHYRHAMPHUS MAJOR, Cab. in Wieg. Archiv, p. 246; *antea*, p. 78, ♂ et ♀.

Jalapa.

27. VIREO NOVEBORACENSIS (Gm.).

Jalapa.

28. CYANOCORAX UNICOLOR, DuBus, Esquisses Orn. pl. 17 (1848); *C. concolor*, Cass. Pr. Ac. Sc. Phil. iv. p. 26 (1848).

Jalapa.

29. CYANOCORAX ORNATUS (Less.), R. Z. 1839, p. 41; Bp. Consp. p. 379.

Jalapa.

30. CYANOCORAX ULTRAMARINUS (Temm.), Pl. Col. 439.

Adult specimens of this bird in M. Sallé's recently received collections from Jalapa seem to be quite the same as Temminck's plate. I believe the bird called *Cyanocitta floridana* in my former list to have been the young of this species.

31. CYANOCORAX NANUS, DuBus, Esquisses Orn. pl. 25.

Jalapa.

The Guatimalan species (*C. pumilo*) which is figured as "*C. nanus*?" in the 'Contributions' (1849, pl. 33) is perfectly distinct from the present bird, and Prince Bonaparte has done quite right in keeping them apart. In the *C. nanus* the throat is silvery whitish-blue, whereas in *C. pumilo* it is quite dark, almost black.

32. *ICTERUS GULARIS* (Wagl.).—*Psarocolius gularis*, Wagl. Isis, 1829, p. 754 ; Des Murs, Icon. Orn. pl. 9.

Dr. Cabanis (Mus. Hein. p.185 (note)) says that *I. mentalis*, Less. Cent. Zool. pl. 41, is not the same as this bird. He gives no reasons for his assertion, and, as far as I can judge from a comparison of descriptions and figures, I am inclined to think otherwise.

33. *ICTERUS PECTORALIS* (Wagl.). — *Psarocolius pectoralis*, Wagl. Isis, 1829, p. 755 ; Des Murs, Icon. Orn. pl. 10.

34. *HYPHANTES BALTIMORENSIS* (Linn.).

Jalapa and S. Andres Tuxtla ; v. P. Z. S. 1856, p. 142.

35. *AGELEUS PHŒNICEUS* (Linn.) ?

Tlacotalpam, March 1856.

This bird is rather smaller in size than specimens from U. S., but seems hardly separable. I have a similar example from Guatemala.

36. *SALTATOR GRANDIS* (Licht.), P. Z. S. 1856, p. 72.

Cordova.

A common Mexican species, which was in M. Sallé's first collection from Cordova, but accidentally omitted in my catalogue. Botteri has sent many specimens from Orizaba, some of which are immature and have the superciliaries yellowish-green and plumage more olivaceous, in which state it is *S. icterophrys*, Lafr.

37. *BUARREMON ALBINUCHUS* (D'Orb. and Lafr.), P. Z. S. 1856, p. 86.

Jalapa.

38. *PYRANGA BIDENTATA* (Sw.), P. Z. S. 1856, p. 126.

Jalapa.

39. *CHLOROPHONIA OCCIPITALIS*, DuBus ; P. Z. S. 1856, p. 270.

Jalapa.

40. *EUSPIZA AMERICANA* (Linn.), P. Z. S. 1856, p. 142.

S. Andres Tuxtla.

41. *CHRYSOTIS AUTUMNALIS* (L.).

Jalapa.

42. *PTEROGLOSSUS TORQUATUS* (Wagl.), Gould, Mon. Rhamph. ed. ii. pl. 20.

S. Andres Tuxtla, called "*Pito real*."

43. *GEOCOCCYX MEXICANUS* (Gm.).

Jalapa.

44. *CHAMÆPELIA PASSERINA* (L.).

S. Andres Tuxtla, April 1856.

45. *GEOTRYGON CHIRIQUENSIS*, Sclater, P. Z. S. 1856, p. 143.

M. Sallé has received a specimen from Jalapa seemingly referable to this species, which is now in Prince Bonaparte's collection.

46. *ORTYX PECTORALIS*, Gould, Mon. Odont. pl. 5.

Jalapa.

47. *DENDRORTYX BARBATA* (Licht.), Gould, Mon. Odont. pl. 22.

Jalapa.

48. *PLATALEA AJAJA* (L.).

Jalapa.

49. *CANCROMA COCHLEARIA* (L.).

S. Andres Tuxtla.

50. *HERODIAS CANDIDISSIMA* (Wilson).

Jalapa.

51. *NYCTICORAX GARDENI* (Gm.).

Jalapa.

52. *ÆGIALITES VOCIFERUS* (Linn.).

Jalapa.

53. *HIMANTOPUS NIGRICOLLIS* (Vieill.).

Jalapa.

54. *PARRA GYMNOTOMA*, Wagl. ; P. Z. S. 1856, p. 283.

Jalapa.

55. *ARAMIDES CAYENENSIS* (Gm.), P. Z. S. 1856, p. 143.

S. Andres Tuxtla.

56. *FULICA AMERICANA* (Gm.).

Jalapa.

57. *QUERQUEDULA DISCORS* (L.).

Jalapa.

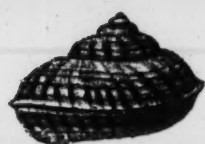
58. *DAFILE ACUTA* (L.).

Jalapa.

59. *ERISMATURA DOMINICA* (Linn.), Pl. Enl. 968.

Jalapa.

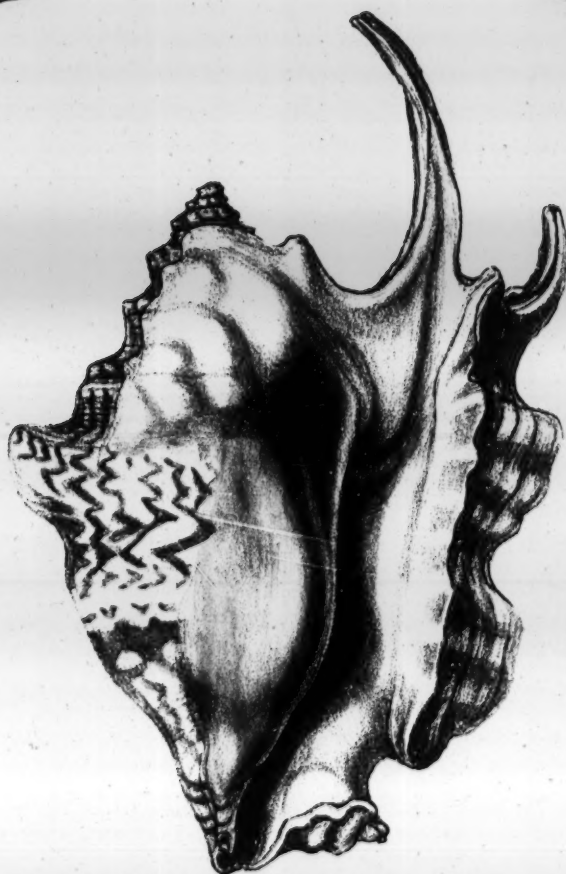
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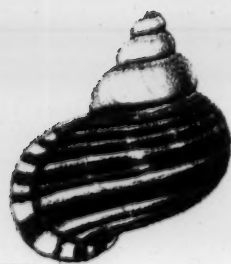
4a



4b



3



2a



2b

1. *Cyclotoma Eugenia* Reeve. 2. *Cyclotoma tubulum* Reeve.
3. *Strombus latus* Reeve.

5 OC 58



1a



1b



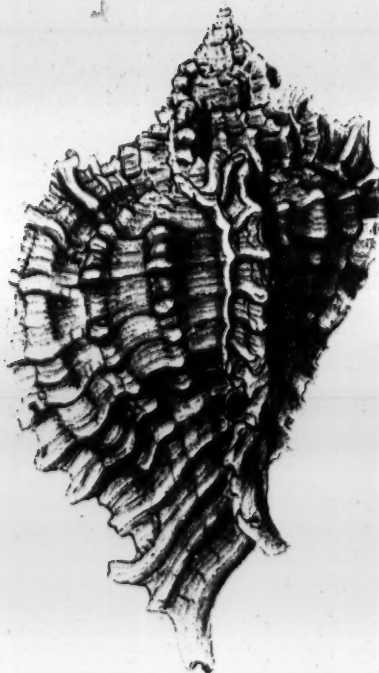
2a



3a



3b



2b



4a



4b

1 *Trochus (Pacholo) alabastrum* Reeve 3 *Pyrua (Murchisonia) de Baryolus* Reeve
2 *Murex Barclayi* Reeve 4 *Cypraea Barclayi* Reeve

60. *PODICEPS DOMINICUS* (L.), Spix, Av. Bras. ii. pl. 101 ;
Max. Beitr. iv. p. 835 ; Gosse, B. Jamaica, p. 440.

Jalapa.

This little Grebe seems to be extensively diffused over the tropical portion of the New World.

61. *PLOTUS ANHINGA* (Linn.).

Jalapa.

62. *PHALACROCORAX MEXICANUS* (Brandt.), Bp. Consp. ii.
p. 173.

Jalapa.

July 28, 1857.

Professor Busk, F.R.S., in the Chair.

The following papers were read :—

1. DESCRIPTIONS OF SEVEN NEW SHELLS FROM THE COLLECTION OF THE HON. SIR DAVID BARCLAY, OF PORT LOUIS, MAURITIUS. BY LOVELL REEVE, F.L.S., F.G.S.

(Mollusca, Pls. XXXVII., XXXVIII.)

Sir David Barclay, a gentleman resident at the Mauritius, and long known to conchologists as a zealous collector of shells, having availed himself of the occasion of visiting this country to bring a few of the rarer specimens of his cabinet for comparison, I have, at his request, examined them, and selected the following as being new :—

1. *STROMBUS TAURUS* (Pl. XXXVII. fig. 3). *Strom. testa ovata, crassissima, ponderosa ; spira exserta, nodoso-tuberculata ; anfractibus transversim striatis et tenuiliratis, ultimo superne obtuse angulatis et perampliter bi-tri-tuberculato, tuberculo obliquo peramplo infra in medio ornato ; columella densissime callosa, superne fere ad apicem appresse dilatata ; apertura subcontracta, labro dense incrassato, tuberculis peramplis obtusis armato superne bidactylo, dactylo supremo elongato, curvato ; albida, aurantio-fusco variegata et sparsim vittata, columella et apertura fauce rubido-carneo tinctis.*

Long. $3\frac{1}{2}$ poll., lat. $2\frac{5}{8}$ poll.

Hab. Amirante Islands, a group of the Seychelles.

This remarkable shell, which Sir David Barclay has for some time past known as an undescribed species, and distinguished in his cabinet by the above name, is curiously intermediate in its generic

characters between *Strombus* and *Pterocera*. In detail of pattern and sculpture it resembles *S. laciniatus*, but there is a large central oblique tubercle on the back, and the tip is thickened into two very large obtuse oblong tubercles, the upper part being produced into two decided *Pterocera* claws, one of which is prolonged in a curved manner to the extent of an inch and a half. The specimen has rather the appearance of being malformed; but notwithstanding this seeming irregularity of growth, there is no doubt whatever of its being specifically distinct from any hitherto described form.

2. *CYPRÆA BARCLAYI* (Pl. XXXVIII. fig. 4). *Cypr. testa pyriformi-ovata, subumbilicata; dorso elevatiusculo, extremitatibus eleganter calloso-productis, subrostratis; basi convexa; dentibus utrinque octodecim ad novemdecim fortibus tumidiusculis; interstitiis conspicue sulcatis, profundis; dentibus exterioribus super labrum decurrentibus, medianis bifidis; nitente, alba, dorso aurantio-spadiceo undique eximie punctato et lentiginoso, extremitatibus aurantio-spadiceo tinctis.*

Long. 1 poll., lat. $\frac{5}{8}$ poll.

Hab. Island of Diego Garcia, a dependency of Mauritius (taken on a block of coral dredged up from deep water).

An exquisitely delicate species in the finest possible condition, perfectly unlike any of this favourite genus hitherto known. It is of an elegantly pyriform shape, with the extremities rather produced; the teeth on each side the aperture being especially characteristic, from their strong development and deeply grooved interstices. The painting is a delicate profusion of orange-buff dots of different degrees of tone upon a shining pearl-white ground; the extremities and teeth, the outer of which extend nearly across the base, being tinged with the orange-buff in a darker and brighter hue.

3. *PYRULA (RHIZOCHILUS) DE BURGHII* (Pl. XXXVIII. fig. 3). *Pyr. testa pyriformi-ovata, subanguste umbilicata; spira breviuscula, turrita; anfractibus superne late angulato-expansis, ad angulum squamis subamplis plano-compressis flabellatim coronatis, infra basin versus attenuatis, undique dense liris, liris subtilissime serratis; alba, aperturæ fauce sulcata.*

Long. $1\frac{3}{4}$ poll., lat. $1\frac{1}{4}$ poll.

Hab. China.

A beautifully turbinated pagoda-like shell, being coronated throughout the expanded angle of the whorls with large compressed fan-shaped scales. It is of the same peculiar typical form as the *Pyrula Mawæ*, the umbilicus being, however, much more contracted, and is believed to be an inhabitant of the same locality.

I have the pleasure of naming this very delicate and remarkable species in honour of Mrs. De Burgh, a lady, whose warm assiduity and zeal in collecting shells is equalled by her intelligent apprehension of their characters and correct estimation of their comparative rarity and beauty.

4. **TROCHUS (EUCHELE) ALABASTRUM.** *Tro. testa subdepresso-conoidea, anguste profunde umbilicata; spira exserta; sutura peculiariter profunde excavata; anfractibus deinde concavis, et fortiter tricarinatis, carinis subirregulariter undatis et exquisite serratis; calcareo-alba, carinis punctis nigris subdistantibus peculiariter notatis.*

Long. $\frac{5}{8}$ poll., lat. $\frac{5}{8}$ poll.

Hab. Island of Diego Garcia, a dependency of the Mauritius.

Of this very striking species there is a second specimen in the collection of Mr. Cuming. It is of a pure chalk-white substance, strongly spirally grooved and keeled throughout, the keels being sparsely dotted with black.

5. **MUREX BARCLAYI.** *Mur. testa trigono-ovata, canali breviuscula, recurva; spira brevi, acuminata; anfractibus transversim tenuissime serrato-liratis et striatis, longitudinaliter trivaricosis, varicibus basin versus conspicue fimbriato-luminatis, interstitiis triseriatim tuberculatis et nodatis; rosaceo-alba, purpurascens et ferrugineo-carneo tincta et maculata.*

Long. $3\frac{1}{4}$ poll., lat. $1\frac{3}{4}$ poll.

Hab. St. Brandon Shoal, near Mauritius (thrown on shore after a hurricane).

This very beautiful species is very closely allied to a shell in Mr. Cuming's collection, which has been attributed by Mr. Sowerby, in his 'Conchological Illustrations,' to *M. trigonulus*, Lamarck. It is also as closely allied to a shell in the collection of the King of Denmark, which was figured for that species by myself in the 'Conchologia Iconica.' From both, however, it is sufficiently distinct to establish its claim to rank as a new species.

6. **CYCLOSTOMA TUBULUM.** *Cycl. testa imperforata, turbinata; spira elevatiuscula; anfractibus rotundatis, laevibus; apertura circulari; labro eleganter expanso; lutescente-alba, nigricantifusco multifasciata.*

Lat. $1\frac{1}{8}$ poll.

Hab. — ?

This very elegant species partakes of the characters of *C. Belairi* and *Boivini*, but is quite distinct from either of those species. There is no umbilicus and very little umbilical callosity. The bands are peculiar in extending over the expanded lip to the extreme edge.

7. **CYCLOSTOMA EUGENIÆ.** *Cycl. testa subprofunde umbilicata, subdepresso-orbiculari; spira brevi; anfractibus ad suturam leviter impressis, deinde convexis, spiraliter dense elevato-striatis, in medio acute tenuicarinatis; apertura circulari, labro (in hoc specimine) simplici; fulvescente-spadicea, infra castaneo plus minus tenue vittata.*

Lat. 1 poll.

Hab. Mauritius (found in the heights of Flacq, at the roots of a Bois-de-Natte tree).

Most nearly allied to *C. filosum*, but of lighter texture and warmer colour.

2. NOTICE OF A LARGE SPECIES OF *LINEUS*?, TAKEN ON THE COAST NEAR MONTROSE. BY DR. JOHN E. GRAY, V.P.Z.S., F.R.S. ETC.

(Annulosa, Pl. XLVIII.)

Mr. Beattie, the Secretary of the Museum of the Natural History Society of Montrose, has kindly presented to the Museum a fragment containing the head of a large marine animal which was taken off the coast near Montrose on the 18th July, 1857.

Mr. Beattie has accompanied the specimen with a figure, and the following note respecting it :—

“Length varies from 18 to 20 inches. After having been taken a few hours, it divided itself into two pieces of nearly equal length, the posterior of which divided itself into 32 different pieces, all of which seemed to me to move for a whole day; the head part, continuing to live for two days, moved about, changing its shape continually, and now and then throwing off an additional joint.”

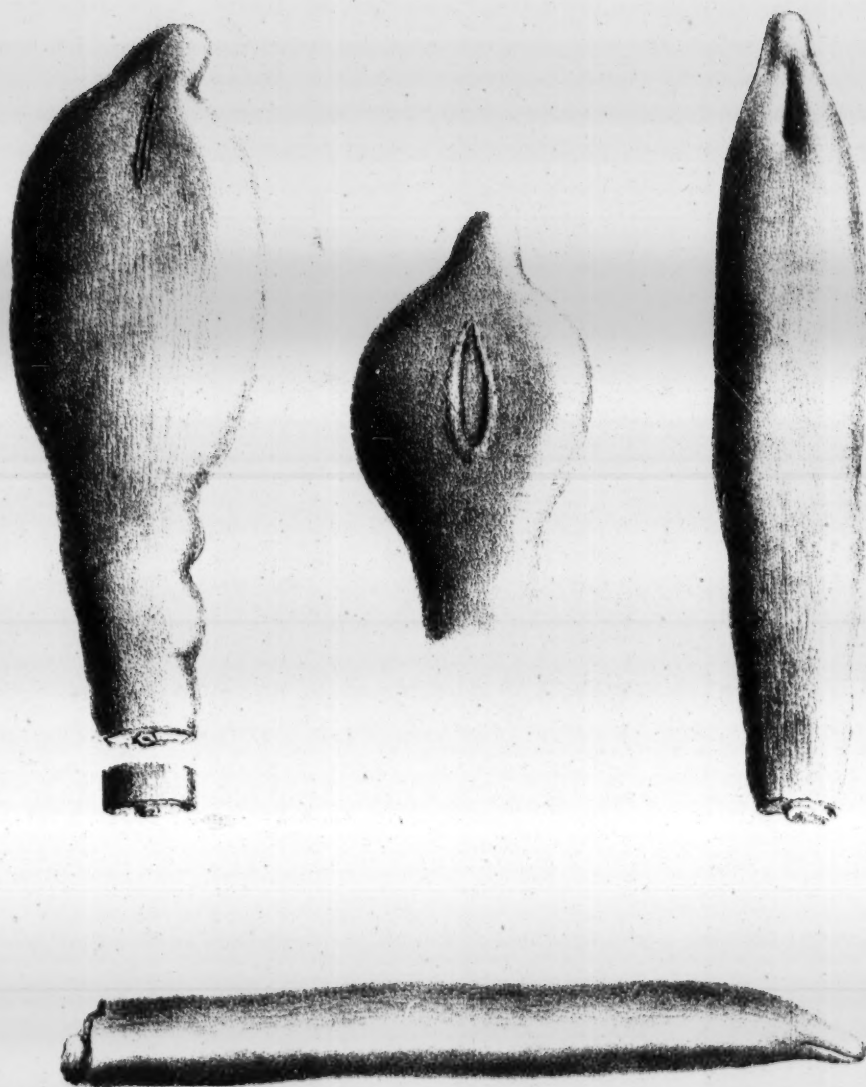
The head portion which is in the British Museum resembles the fragment of a very large *Lineus*, with a large longitudinal mouth opening into a longitudinal cavity, which extends the whole of its length, having a central, broad, longitudinal rounded ridge extending the whole length of the dorsal surface. The sides of the body are irregularly torn.

The specimen is in far too imperfect a condition to describe, but I think that it may be provisionally named *Lineus Beattiae*, after its discoverer; and I hope that we may be favoured with a more perfect description of the animal made from a living specimen.

I may observe, that there is a large round hole in the centre of the lower part of the body, about one-fourth the entire length from the mouth, which has been mistaken by some persons for the vent; but it is evidently an artificial perforation extending entirely through the substance of the body, and piercing both surfaces of the central cavity.

3. ON A COLLECTION OF BIRDS MADE BY SIGNOR MATTEO BOTTERI IN THE VICINITY OF ORIZABA IN SOUTHERN MEXICO. BY PHILIP LUTLEY SCLATER, M.A., F.L.S. ETC.

Signor Matteo Botteri, the well-known Dalmatian botanist and traveller, has transmitted to Mr. S. Stevens a considerable collection of birds formed in the vicinity of Orizaba in Southern Mexico, where he has lately been resident in pursuit of his investigations in various branches of natural history. Having recently been engaged in studying the fine series of specimens of birds obtained by M. Sallé at



LINEUS BLATTIAE Gray

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localities not very distant from M. Botteri's head-quarters, it was with much pleasure I undertook, at Mr. Stevens's request, to look through this collection—concerning which I now beg to submit the following remarks to the Society. The greater part of the birds obtained by Signor Botteri belong, as might have been expected, to species which have already been mentioned as occurring in M. Sallé's collections. I do not think it necessary therefore to repeat the names of these birds, which are upwards of 120 in number; but I think it will be useful to note the species contained in Signor Botteri's collection, of which M. Sallé has not as yet obtained specimens, so as to render the list of S. Mexican birds as complete as possible.

Mr. J. H. Gurney has kindly communicated to me the names of the *Accipitres* in Signor Botteri's collection, and Mr. Gould has been so good as to examine the Humming-birds.

1. *CATHARTES AURA* (L.)?

2. *CATHARTES ATRATUS* (Bartram)?

I have not myself the means of instituting a comparison between these examples and specimens from the United States and from South America—so I cannot say whether they are really referable to the northern or southern species—if these are really truly distinct.

3. *POLYBORUS THARUS* (Mol.).

This peculiar *Accipitrine* ranges over the whole of South America down to Patagonia, and northwards as far as Texas and Florida.

4. *BUTEO HARLANI*, Aud.

Mr. Gurney considers this bird probably a variety of *Buteo borealis*. Mr. Gurney remarks, "There appears to me to be two varieties of *Buteo borealis* frequently met with: one with a rufous breast and belly, found in Mexico, Texas and California; the other with a smoky-brown breast, found in Mexico, Texas, and some of the Southern States, but not, as far as I have observed, westward of the Rocky Mountains, and therefore differing in this particular from the range of the red-bellied variety. This brown-bellied variety is the *Buteo harlani* of Audubon, as may be seen by reference to his original specimen in the British Museum."

The rufous-breasted bird spoken of by Mr. Gurney is doubtless the same as that called "*Buteo montanus*, Nuttall," by Mr. Cassin in Proc. Ac. Sc. Phil. viii. p. 39, and previously confounded by him with *Buteo Swainsoni*.

5. *BUTEO LINEATUS* (Gm.).

6. *BUTEO PENNSYLVANICUS*, Wilson.

7. *BUTEO ERYTHRONOTUS* (King): Strickl. Orn. Syn. p. 34.

8. *MORPHNUS ANTHRACINUS* (Licht.): Strickl. Orn. Syn. p. 25.

9. *CIRCUS HUDSONIUS* (Linn.).

10. OTUS BRACHYOTUS (Linn.).

11. COTYLE FLAVIGASTRA (Vieill.), Temm. Pl. Col. 161. fig. 2.

A single specimen in M. Botteri's collection seems undoubtedly referable to this species, which I little expected to find so far north.

12. CYANOMYIA CYANOCEPHALA (Less.).

M. Botteri's collection contained specimens of three other *Trochilidae*, namely *Delattria rhami*, *Amazilius arsinoe*, and *Trochilus colubris*, all of which also occurred in M. Sallé's series from Cordova.

13. SALPINCTES MEXICANUS (Sw.), Bp. Consp. p. 224.

14. HELMITHEROS CELATUS (Say), Bp. Consp. p. 315.

15. HELMITHEROS — ?

Botteri, no. 130.

An obscure species, probably the same as no. 64 of Sallé's collection.

16. HELMITHEROS — ?

A small greenish species apparently of this genus, of which I have also specimens in my own collection from Guatemala and Mexico.

17. REGULUS SATRAPA, Licht.

A young bird of this species, which has already been noticed as far south as Texas. See Sitgreave's Report, p. 67.

18. TURDUS MINOR, Gm.; Bp. Consp. p. 271.—*Merula olivacea*, Brewer.—*Turdus olivaceus*, Giraud, B. Long Island, p. 91 (1844).—*Turdus swainsoni*, Cab. in Tsch. F. P. p. 48?

M. Botteri's examples do not appear to differ much from the N. American bird, and the New Grenadian *T. minimus*, Lafr., is hardly separable. I have also seen specimens from Guatemala, which are referable to this species.

19. TURDUS SOLITARIUS, Wilson; Bp. Consp. p. 270.—*Turdus silens*, Sw. Phil. Mag. 1827, p. 369.

This species is easily distinguishable from the last by its rufous tail. It is common in New Jersey, U. S. A., where I obtained specimens in October 1856, and, I believe, in the United States generally. Botteri's examples do not differ from these.

20. TOXOSTOMA CURVIROSTRE (Sw.), vide antea, p. 126.

21. MIMUS POLYGLOTTUS (Linn.).

Already noticed by Mr. Swainson (Phil. Mag. 1827, p. 369) as inhabiting Mexico, but M. Botteri's specimen seems smaller; and further examination and comparison of specimens should be made to prove this species identical with the N. American bird.

NEOCHLOE, gen. nov.

Neochloe genus novum Vireoni affine, sed ad Sylvicolam et hujusmodi genera spectans. Rostrum magis carinatum, basi latiore, apice magis acuta: alæ breves, quadratæ, remige prima brevi, secunda longiore, quarta, quinta, sexta et septima fere æqualibus et tertiam paulo superantibus; secundariis longis et primariam tertiam excedentibus: pedes ut in genere Vireone.

22. NEOCHLOE BREVIPENNIS, sp. nov.

N. cinereus, dorso murino et viridi paululum lavato: capite toto supero cum marginibus alarum et caudæ flavicanti-viridibus; remigibus et rectricibus intus nigricanti-cinereis: abdomine medio crissoque albis.

Long. tota 5·0, alæ 2·2, caudæ 2·1.

Of this little bird must, I think, be constituted a third genus of *Vireoninæ*; the peculiar form of the wing rendering it impossible to arrange it as either a *Vireo* or *Vireosylva*. It has much of the general form of a small species of the former genus, but is readily separable by the short and square wing, all the secondaries (except the three outer) exceeding the second primary in length.

M. Botteri's collection contains one example of this bird (numbered 277), which is labelled "Orizaba, 8 Oct. 1856."

23. VIREOLANIUS MELITOPHRYS, Bp. Consp. p. 330.

Botteri, no. 325.

A single specimen of this very curious bird in Sig. Botteri's collection is the first that has ever come under my notice. This being the type of the genus, the species called *Vireolanius icterophrys*, Bp. (P. Z. S. 1855, p. 151. pl. 103) will be rather abnormal—the bill being more like *Cyclorhis* and the tail shorter. This form seems to unite *Vireo* and *Cyclorhis*, and inclines me to agree with Prince Bonaparte's views in arranging them not far apart. *Icteria* also, to which the present bird shows much resemblance in colour, should probably be placed in the same family.

24. MYIADESTES OBSCURUS, Lafr. R. Z. 1839, p. 99.

M. Botteri has transmitted examples of this bird, as also of my *M. unicolor* (P. Z. S. 1856, p. 299), a nearly allied species.

25. MOLOTHRUS PECORIS (Gm.).

Agrees with N. American specimens. Also noticed by Mr. Swainson, Phil. Mag. 1827, p. 436.

26. AGELEUS GUBERNATOR (Wagl.), Bp. Consp. p. 430.

27. HEDYMELES MELANOCEPHALUS (Sw.).—*Guiraca melanocephala*, Sw. Phil. Mag. 1827, p. 438.

28. PYRANGA HEPATICA (Sw.), P. Z. S. 1856, p. 124.

29. PYRANGA LUDOVICIANA (Sw.), P. Z. S. 1856, p. 125.

30. *SPIZA VERSICOLOR*, Bp. P. Z. S. 1837, p. 20.

Specimens of this bird were obtained by Lieut. Couch in the State of New Leon, which are now in the Museum of the Philadelphian Academy,—so it appears to be distributed all through Mexico.

31. *AMMODROMUS* — ?

M. Botteri has transmitted a single example—not in very good order—of a bird apparently belonging to this genus, which is probably undescribed. It somewhat resembles *Ammodromus ruficeps*, figured by Mr. Cassin in his 'Birds of California,' but is more cinereous in plumage. I wait for additional specimens before venturing to characterize as new a bird belonging to this complicated group.

32. *ZONOTRICHIA BOTTERII*, sp. nov.

Supra ex cinereo rufescens, capitis et dorsi medii pennis medially fusco-nigris, harum autem marginibus rufescentibus, colore rufescente fusco mixtis: alis nigricantibus, tectricibus omnibus pallido fusco late, remigibus rufo anguste, extus limbatis: cauda graduata, nigricante; rectricum externarum apicibus valde dilutioribus, pallide cinereis: subtus albidus, pectore cinerascentiore, gula clariore, præcipue ad latera rufescente irroratus: carpo flavicante: alis et cauda subtus cinereis: rostro plumbeo; tomis pallidioribus: pedibus flavis.

Long. tota 6.0, alæ 2.5, caudæ 2.6.

I have in vain attempted to identify this bird with any of the known species of N. American *Zonotrichiæ*, and am forced to the conclusion that it is probably undescribed. It comes nearer to *Z. cassinii*, Woodhouse (Proc. Ac. Sc. Phil. vi. p. 60), than to any other species with which I am acquainted; but differs from this entirely in the markings of the upper surface, the whole centre of the feathers being dark, whereas in *Z. cassinii* the dark colour is confined to a subapical spot. The structure of the two birds is very much alike, but the feet are rather stronger in the present species. I hope M. Botteri will forward better specimens of this interesting species (the examples in the present collection being badly preserved), so as to allow me to make a more accurate investigation of its differential characters.

33. *PICUS JARDINII*, Malh. R. Z. 1845, p. 374.

A single example, wanting the tail, is apparently referable to this rather curiously coloured species of *Picus*.

34. *COCCYZUS ERYTHROPHthalmus* (Wils.).

One specimen, apparently of this species, seems to be rather smaller in size than N. American examples.

35. *LEPTOPTILA ALBIFRONS*, Bp. Consp. ii. p. 74. — *Perist. brachyptera*, G. R. Gray, in Mus. Brit.

Much confusion has been caused in the nomenclature of this

Pigeon (as in numberless other instances) by the practice of publishing names without descriptions.

36. TRINGOIDES MACULARIUS (Linn.), Wils. Am. Orn. pl. 59. fig. 1.

37. GLOTTIS MELANOLEUCA (Gm.). — *T. vociferus*, Wils. Am. Orn. pl. 58. fig. 5.

38. QUERQUEDULA CAROLINENSIS (Gm.), Wils. Am. Orn. pl. 70. fig. 4.

4. ON THE PRESENCE OR ABSENCE OF AIR IN THE BONES OF BIRDS. BY EDWARD CRISP, M.D. ETC.

In my last communication upon this subject (see p. 9), I stated that I purposed adding to the list of birds dissected, and afterwards describing the air-sacs in the thoracic and abdominal cavities; the method by which air is admitted to the hollow bones, and the flight of birds in relation to these matters; but as the communication is longer than I expected, I will reserve the second part of my subject, viz. the admission of air to the bones, for my next and concluding paper.

My dissections * have not been so numerous as I could have wished, but the following list, in addition to that of my first communication, will, I think, enable me to form tolerably accurate conclusions. The birds since examined are the following:—

Kestrel. <i>F. tinnunculus</i> .	Jay. <i>C. glandarius</i> .
Kite. <i>F. milvus</i> .	Crow. <i>C. corvus</i> .
Common Buzzard. <i>F. buteo</i> .	Cuckoo. <i>C. canorus</i> .
Marsh Harrier. <i>F. cæruginosus</i> .	Spotted Woodpecker. <i>P. major</i> .
American Eagle Owl. <i>S. Americanus</i> .	Grey Parrot. <i>P. erythacus</i> .
Long-eared Owl. <i>S. otus</i> .	Crested Parakeet. <i>P. Nova Hollandiæ</i> .
Tawny Owl. <i>S. aluco</i> .	Impeyan Pheasant. <i>P. Impeyanus</i> .
Barn Owl. <i>S. flammea</i> .	Heron. <i>A. cinerea</i> .
Glossy Starling. <i>Juida nitens</i> .	Turnstone. <i>S. interpres</i> .
Spotted Fly-catcher. <i>M. grisola</i> .	Sarus Crane. <i>G. Antigone</i> .
Whin-chat. <i>S. rubetra</i> .	Bean Goose. <i>A. segetum</i> .
Wood Wren. <i>S. sibilatrix</i> .	Cereopsis Goose. <i>Cereopsis Nova Hollandiæ</i> .
Willow Wren. <i>S. trochilus</i> .	Eider Duck. <i>A. mollissima</i> .
Blue Titmouse. <i>P. cæruleus</i> .	Smew. <i>Mergus albellus</i> .
Marsh Titmouse. <i>P. palustris</i> .	Red-necked Grebe. <i>P. rubricollis</i> .
Long-tailed Titmouse. <i>P. caudatus</i> .	Great Northern Diver. <i>C. glacialis</i> .
Black-headed Bunting. <i>E. schæniclus</i> .	Cormorant. <i>C. cormoranus</i> .
Canary. <i>C. canaria</i> .	

* I have examined the skeletons of numerous birds not mentioned in the above lists; but for the sake of greater accuracy, I think it better to confine myself to birds dissected soon after death.

The above list of thirty-five birds (eight of them foreign) includes eight rapacious; of these the Falconidæ had air in the humeri, femora, and bones of the trunk. The four Owls, Strigidæ, had air in the humeri. Of the twelve passerine birds the Carrion Crow, Jay, and the Tits had air only in the humeri; whilst the remaining seven, including five birds of passage, had no air in the bones. The humeri of the Impeyan Pheasant were hollow. In the four climbing birds the humeri contained air, but the femora were full of marrow. In the three Waders, the Turnstone had the bones of the limbs free of air, but the humeri of the Heron and Sarus Crane were hollow. In three of the web-footed birds, the geese and ducks had air in the humeri, but the other four birds were without air in the bones of the extremities. So that only five Falconidæ of the above thirty-five birds, had air in the limbs; the arm-bones of nineteen were hollow, and in twelve the limb-bones contained marrow.

General Summary.—Adding these specimens to the fifty-two before described, the deduction is as follows. Air in many of the bones, 5 (Falconidæ); air in the humeri and not in the inferior extremities, 39; no air in the extremities, and probably in none of the other bones, 48. I say probably, because I have not inspected the trunk bones in all; but in the Swallow, Martin, Snipe, and many birds of passage, I have found all the bones filled with marrow, and I infer that when the bones of the limbs contain no air, those of the trunk are also air-less.

It will be remarked that I have spoken chiefly of the bones of the extremities; but in many birds that have air in the humeri and femora, the sternum, clavicles, scapulæ, furcula and vertebræ are also supplied with this fluid. In the sternum, the air-holes are seen at the base of the keel; in some birds one air-hole only is present, in others, many exist, giving this part a cribriform appearance; the vertebræ, too, of some birds (especially the Falconidæ), as shown in a section of the spine of the Golden Eagle (*A. chrysaëta*), are composed of a beautiful net-work of bone, rendering them extremely light.

The fact that I am especially anxious to bring before the Society is, that in no bird that I have inspected did the bones of the extremities beyond the humeri and femora contain air.

Air-sacs in the thoracic and abdominal cavities.—I have examined these in the various classes of birds, and have found a great resemblance in all. They are mostly larger in high-flying birds and those of long and rapid flight. The best mode of inspecting the cavities, which are formed by doublings of the pleural or peritoneal membranes, is to inflate them in the dead bird by means of a bellows pipe inserted in the trachea. A ligature is then placed upon the tube, and the body of the skinned bird exposed to a slow heat for a few hours; the membranes are by this means rendered dry and stiff, so that the thoracic and abdominal viscera may be removed. The body of the Long-eared Owl (*S. otus*) on the table has thus been treated, and many of the air-sacs are plainly seen. But I cannot describe more minutely the situation and form of these sacs in

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I have examined a great resem- g birds and in inspecting these al or peritoneal means of a blow- ed upon the air- a slow heat for dered dry and ay be removed. table has been n. But let me ese sacs in a few

birds. In the Barn Owl (*S. flammea*) the upper part of the chest is closed (as in most birds) by a tough membrane; in the thoracic cavity are two anterior and two posterior sacs on each side, and a middle cavity, which may be called the sternal sac. The inferior boundary of these sacs is a transverse duplicature at the base of the heart. In the upper part of the abdomen are two large sacs surrounding both lobes of the liver, and a triangular sac between them. On each side is a long anterior sac, the left extending from the lung above, having the stomach and gullet on the inner side and the ribs on the outer, bounded below by a membranous expansion extending from the last ribs to the abdominal muscles. On the right side nearly the same arrangement prevails. Posterior to the last described are two large sacs covering the kidneys, and extending to the coccyx.

In the abdomen the apertures in the lungs, by which air escapes into these cavities, are seated below the membranous diaphragm on each side; they are best seen by inflating the trachea when the bird is under water; but in some birds, the geese for example, the apertures are so large, that they are readily seen without inflation. In the Long-eared Owl (*S. otus*), the Tawny Owl (*S. aluco*), Marsh Harrier (*F. aeruginosus*), and Common Kite (*F. milvus*), there is nearly the same arrangement. In the Gulls (*Laridæ*), which, judging from those dissected, have no air in the bones, these sacs are very large, and the bodies of these birds may be blown out to a great size. In the Pelican (*P. onocrotalus*), they are comparatively larger than in any bird I have examined.

These cells are all readily distended by inflation through the trachea, and when one of them is punctured the others become lax. If the inflation is made through the femur in one of the Falconidæ, the air escapes by the trachea, but I have not succeeded in inflating the abdominal cells through the humeral aperture; numerous experiments, however, will be required before one can speak positively upon this subject.

The aperture by which the air is admitted into the humerus is seated upon the upper and inner part of the head of this bone. It is of a rounded or oval form, sometimes consisting of a single opening, and in other instances, especially in the smaller birds, of several small perforations in a thin layer of bone. In the Black Swan (*C. niger*) there is a curious net-work at the entrance, consisting of eighty or a hundred openings. In the Golden Eagle (*A. chrysaëta*) the external aperture is large, with numerous small perforations. In the Snowy Owl (*S. nyctea*) it is of a circular form, with a few small openings through a thin layer of bone. In the thigh bone this aperture (when present) varies in shape: in some of the Owls two small openings exist, with a ridge between them; in the Golden Eagle and in most of the Falconidæ I have examined, it is of large size.

I have examined the humeral aperture in many young birds, Hawks, Owls and Magpies, when full-fledged, and have found it closed by a thick covering, the spot being indicated by the bloody appearance of the membrane. In these young birds, which in the

adult state have hollow humeri, the cavity of these bones is filled with thin marrow; and probably it is not till some time after the wings have been used, that the air-hole is formed by the absorption of the membranous covering.

In my last paper I stated that in one Swift (*C. apus*) the humeri were filled with marrow, and in two others they were hollow. I have only been able to obtain one other specimen, and in this the humerus was hollow; so that the first described was probably a young bird: and the same remark will apply to the Goat-sucker (*Caprimulgus*), which I now find has in the adult state a hollow humerus.

The hollow bones are strengthened at their extremities by cross and transverse beams; but notwithstanding the assertion of many, that a hollow bone is stronger than one containing marrow, I believe these bones to be considerably weaker: they are readily splintered by shot, as all who are accustomed to shoot a variety of birds are aware, from the number of broken wings among the accipitrine and gallinaceous birds. Some humeri containing marrow are of great strength and thickness, and very difficult to break; indeed a shot may pass through them without splintering the bone. The humerus of the Great Northern Diver (*C. glacialis*) on the table, is as thick and heavy as that of most quadrupeds: the cavity for the marrow is very small, and the parietes of the cylinder measure 3 lines. In addition to its great weight, it is 3 inches in length, forming a remarkable contrast with the Swift (*C. apus*), the length of which is only 4 lines.

Before closing this division of my paper, I may mention that most writers, in describing the humerus of a bird, speak of the air-hole as if generally present; but I believe in the majority of birds it is not to be found in this or any other bone.

The manner in which air is supplied, and the muscular apparatus connected with the humeral and femoral apertures, will, as I have said before, be given in another communication. I may merely observe here, that a prolongation of the thoracic air-sac is continued over the joint, so as to allow of the most perfect mobility. The thigh-bone, when hollow, is supplied with air in a like manner.

The flight of birds in relation to the presence of air in the bones.
—Notwithstanding the assertion before quoted, “that in the diurnal birds of prey, as in almost all other birds of flight, the femur is filled with air,” it will be found, on reference to the table, that scarcely one bird of flight has a hollow femur, and that the great majority of the British birds of passage have no air in the bones, judging from those examined; thus of the twenty-one birds of passage named in the tables, only five, the Turtle-Dove, Swift, Goat-sucker, Cuckoo and Bean Goose had hollow humeri, but these had no air in the femur; the remaining sixteen had marrow in all the bones of the limbs. It will be seen also that many birds of short flight, as the Tits, Woodpeckers, and others, have hollow humeri.

The presence of air too in the humerus does not appear to in-

fluence the mode of flight, as instanced by the Swift, Swallow, and Martin, the Tits and the Wagtails, the Starlings and Partridges. It will probably be found, when this matter is more fully investigated, that all soaring birds, and those that remain stationary in the air for a short time, have hollow humeri, as the Falcon and Skylark. It will be interesting also to observe the influence of climate as regards the presence of air in the bones.

If we look to the form and length of the bones of the wing, how different are they in birds possessing almost equal powers of flight! Take this example before me, the wing of the Swift and of the Marsh Harrier. The length of the bones of the former is:—humerus, 4 lines; cubitus, 8 lines; metacarpus, 8 lines; phalanges, 4 lines; total 2 inches; longest primary feather, $5\frac{1}{2}$ inches. Total length of wing, $7\frac{3}{4}$ inches.

In the Marsh Harrier the humerus is 4 inches in length; cubitus, $4\frac{3}{4}$ inches; metacarpus, $2\frac{1}{2}$ inches; phalanges, 1 inch; and pollex, $\frac{3}{4}$ of an inch; the longest primary feather, 12 inches; the length of the bones, 13 inches. Total length of wing, 23 inches.

The difference in the comparative length of the wing-bones in these birds is very remarkable, and numerous instances of a similar kind might be adduced; but I am obliged to limit myself to a few examples.

From the above investigation I have come to the subjoined conclusions:—

1st. That in the majority of British birds no air-cavities connected with the lungs are present in the bones.

2ndly. That the presence of air in the bones is not necessary for swift and long-continued flight, as instanced especially by the Gulls, Snipes, Swallows and Martins.

3rdly. That in no bird that I have examined was air found in the bones of the extremities beyond the *humeri* and *femora*.

Dr. Crisp exhibited a nest he had found in June last in the eastern part of Suffolk, which he believed to be that of the Great Grey Shrike (*Lanius excubitor*). It was placed in a thick hawthorn fence, about 12 feet from the ground, upon a large forked branch. It was composed chiefly of dried grass and a little moss on the exterior, the lining of short grass; no horsehair nor clay was present; the form rather shallow, and the size about that of the Missel Thrush (*T. viscivorus*), the diameter 6 inches, the greatest depth from the rim 4 inches; from the top of the dome next described to the bottom of the nest $9\frac{1}{2}$ inches. It was closely domed over with twigs, varying in length from 8 to 12 inches, a small hole being left in the rim for the entrance of the bird. The nest resembled that of the Magpie (*P. caudata*) in miniature, but, as before stated, no clay entered into its composition.

Dr. Crisp was inclined to think that this was the deserted and unfinished nest of the Grey Shrike, as two birds of the colour of a Jay were seen about the spot early in the spring by a person well

acquainted with all our common birds, and who stated that "he never before saw any birds of a similar kind." Dr. Crisp also thought that near a wood where Squirrels, Jays and Magpies were abundant, as in this locality, the bird might sometimes cover its nest. Mr. Wolf informed him, "that he once found a nest of this description in Germany, which he believed was that of the Grey Shrike."

November 10, 1857.

Dr. Gray, F.R.S., V.P., in the Chair.

The following papers were read:—

1. ON SEVERAL NEW SPECIES OF BIRDS FROM VARIOUS PARTS OF THE WORLD. BY JOHN GOULD, V.P., F.R.S. ETC.

Mr. Gould called attention to three species of Australian birds collected by Mr. Elsey during the recent expedition under A. C. Gregory, Esq., from the Victoria River on the north-west coast to Moreton Bay: two of these birds were of especial beauty and interest, viz. a *Psephotus* and a *Malurus*. The former is allied both to the *P. pulcherrimus* and *P. multicolor*, but differs from either, among other characters, by the rich yellow mark on the shoulder; and the *Malurus* is distinguished from all the other members of its genus by its larger size and by the beautiful lilac circle which adorns the crown. The third species alluded to was a *Petroica*, allied to the *P. superciliosa*, a bird discovered by the late Mr. Gilbert in the neighbourhood of the Burdekin Lakes, and which with the present would admit of separation from the other species of the genus.

For the Parrakeet Mr. Gould proposed the name of

PSEPHOTUS CHRYSOPTERYGIUS.

Male.—Band across the forehead, extending above the eye to its posterior angle, very pale yellow; on the centre of the crown a patch of black; sides of the head, cheeks, neck, throat, upper portion of the abdomen, lower part of the back, rump and upper tail-coverts, verditer blue, somewhat greener on the cheeks and upper tail-coverts; immediately below the eye a tinge of yellow; back of the neck, back and scapularies, light greyish-brown, slightly tinged with green; shoulder and lesser wing-coverts fine yellow; primaries and secondaries black, margined externally with blue; feathers of the lower part of the abdomen, vent, and under tail-coverts, light scarlet, margined with greyish green; two centre tail feathers dark green at the base, passing into deep blue towards the extremity, and tipped with dull black; the remaining tail feathers light green crossed by an

irregular oblique band of dull bluish black, beyond which they become of a paler glaucous green, until they end in white; but each has a dark stain of bluish green on the outer margin near the tip; irides brown; bill and nostrils bluish horn-colour; feet mealy grey.

Total length, 11 inches; bill, $\frac{3}{8}$; wing, $4\frac{1}{4}$; tail, 7; tarsi, $\frac{1}{2}$.

Female.—Similar to the male in colour, but all the hues much paler, and the markings much less strongly defined.

Young.—In this state the whole of the head, all the upper surface, wing-coverts, throat, and breast are of a pale glaucous green; the rump and upper tail-coverts and the tail similar to the same parts in the male, but not so bright; and the lower part of the abdomen is greyish white, with faint stains of scarlet.

In the notes accompanying the specimens, Mr. Elsey states that they were procured on the 14th of Sept., 1856, in lat. 18° S. and long. $141^{\circ}30'$ E., that their crops contained some monocotyledonous seeds, and that the *os furcatorium* was small, but well-developed; of this he was certain, as he had a discussion with Mr. Gregory on the subject, and dissected on the same day *Platycercus palliceps* and *Aprosmictus erythropterus*, and noticed that while the former was entirely destitute of that bone, and had only a weak ligamentous band in its place, the latter had a distinct *os furcatorium* closely resembling that of *Psephotus*. He remarked, too, that the flight of the *Psephotus* was swift and decided; and adds, that he never saw it on the ground, although the contents of its crop would indicate that it obtained its food there.

The Malurus he designated

MALURUS CORONATUS.

Male.—Crown of the head rich lilac purple, with a triangular spot of black in the centre, and bounded below by a band of velvety black, which commencing at the nostrils passes backwards through the eye, dilates upon the ear-coverts, and meets at the back of the neck; back and wings light brown; tail bluish green, becoming of a deeper hue towards the extremity; lateral feathers margined externally and tipped with white; under surface buffy white, becoming gradually deeper on the flanks and vent; irides brown; bill black; feet fleshy brown.

Total length, $6\frac{1}{2}$ inches; bill, $\frac{3}{4}$; wing, $2\frac{1}{4}$; tail, $3\frac{5}{8}$; tarsi, $1\frac{1}{8}$.

Female.—All the upper surface light brown; lores and space behind the eye white; ear-coverts chestnut; in other respects similar to the male.

Hab. Victoria River, North-Western Australia.

The Petroica he proposed to call

PETROICA? CERVINIVENTRIS.

All the upper surface, wings and tail chocolate-brown; line over the eye, throat, tips of the greater wing-coverts, base of the primaries, base and tips of the secondaries, and tips of the tail, white;

breast grey; abdomen deep fawn colour, becoming almost white in the centre; bill black; feet blackish brown; irides dark brown.

Total length, $6\frac{1}{2}$ inches; bill, $\frac{3}{4}$; wing, $3\frac{1}{4}$; tail, $3\frac{1}{4}$; tarsi, $\frac{7}{8}$.

Hab. Victoria River, North-western Australia.

The three birds above described are in the British Museum.

The next species to which he directed attention was a new Hawk belonging to the genus *Spilornis*, and which differs remarkably from the *S. undulatus* or Bacha of the continent of India, and the *S. holospilus* of Manilla.

For this bird he proposed the appellation of

SPILORNIS RUFIPECTUS.

Crown of the head and the lengthened feathers of the occiput deep black, the occipital plumes margined at the tip with rufous; feathers at the nape black, margined with rufous, showing conspicuously; all the upper surface and wings dark chocolate-brown, with paler edges; chin and sides of the neck greyish black; chest deep cinnamon-brown; primaries and secondaries blotched with white at intervals on their internal web; under wing-coverts, abdomen, vent, thighs, and under tail-coverts cinnamon-brown, crossed by bands composed of two large spots of white bounded above and below with a narrow line of black; tail dark brown, crossed near the base by a narrow and not very distinct band of greyish, and near the apex by broad bands of a lighter hue passing into whitish on the edges of the internal webs and narrowly edged at the tip with pale reddish-brown and white; bill blackish-brown; the cere, naked orbits, and feet appear to have been yellow.

Total length, $19\frac{1}{2}$ inches; bill, $1\frac{3}{8}$; wing, $13\frac{1}{4}$; tail, 9; tarsi, $2\frac{3}{4}$.

Hab. Celebes, vicinity of Macassar. From the collection of Mr. Wallace.

The next was a highly interesting species of Bullfinch, which he designated

PYRRHULA AURANTIACA.

Male. Bill, face, wings, and tail deep purplish-black; rump, upper and under tail-coverts white; the remainder of the upper and under surfaces rich reddish-orange, deepest above; the lesser wing-coverts are also reddish-orange, as is the apical half of the innermost of the greater wing-coverts, while the outer ones are slightly tipped with buffy-white; irides black; feet pinky-flesh colour.

Total length, $5\frac{1}{8}$ inches; wing, $3\frac{1}{4}$; tail, $2\frac{3}{8}$; tarsi, $\frac{5}{8}$.

Female. Has the black circle round the bill; head and neck ash-coloured; back ash colour, tinged with orange-red; lower parts like those of the male, but much less brilliant and approaching to olive.

For his knowledge of this pretty species Mr. Gould was indebted to the researches of Dr. A. Leith Adams of the 22nd Regiment, who killed it on the Western Himalayas, and who informs me that he

first met with it in the month of March 1852, on one of the wooded slopes of the Pir Pinjal Mountains, westward of the valley of Cashmere; its habits closely resemble those of *P. erythrocephala*, frequenting as it does thick bushy places, and being usually seen in small societies. It is not uncommon in the valleys and jungles around Cashmere. Dr. Adams remarks that, although the two species are so similar in their habits and in the localities they frequent, he never met with them in company; but noticed that while the *P. erythrocephala* is tolerably abundant in the ranges around Simla, the present species was only seen on the hills in the neighbourhood and to the westward of Cashmere. Its call is not so loud as that of *P. vulgaris*, and somewhat resembles the chirp of the Greenfinch, *Chlorospiza chloris*.

For a new Motmot Mr. Gould proposed the name of

MOMOTUS ÆQUATORIALIS.

Crown of the head deep black, surrounded by a zone of verditer green, to which succeeds a line of fine deep blue from the anterior portion of one eye round the occiput to the anterior portion of the other; to this succeeds a fringe of deep black from the nostrils round the back of the neck; lores, space below the eye and ear-coverts black, with a very fine fringe of blue on the lower edge and a small tuft of verditer green at its hinder extremity; all the upper surface green, washed with cinnamon on the shoulders; primaries green on their external webs, black on the inner; tail dark bluish-green; under surface green, washed with cinnamon and with a tuft of broad round black feathers, margined at their base with verditer green, in the centre of the breast; bill black; feet blackish-brown.

Total length, 16 inches; bill, $2\frac{1}{8}$; wing, $6\frac{1}{2}$; tail, $8\frac{3}{4}$; tarsi, $1\frac{1}{4}$.

Hab. Archidona, near the Equatorial line, on a branch of the Rio Napo.

Remark.—This is a large and robust species, and differs from all others in the broad spatulate feathers of the breast tuft.

A very fine *Odontophorus*, remarkable for the rich chestnut-red colouring of its under surface, received the appellation of

ODONTOPHORUS HYPERYTHRUS.

Crown of the head, wings, and upper surface of the body dark brown, minutely freckled with black; orbits naked, beset with minute white feathers continued in a stripe behind the eye; on the centre of the back and wing-coverts are large blotches of velvety-black; and at the tip of the innermost secondaries a small oval spot of buff; throat, sides of the chest, breast, and abdomen dark chestnut-red; vent, thighs, and under tail-coverts blackish-brown, indistinctly banded with dark sandy red; tail nearly black; bill and feet blackish-brown.

Total length, 10 inches; bill, $\frac{7}{8}$; wings, $5\frac{3}{4}$; tail, $2\frac{1}{2}$; tarsi, $2\frac{1}{8}$.

Hab. Santa Fé de Bogota.

Remark.—For this bird Mr. Gould is indebted to the Messrs. Verreaux of Paris, who obtained it in a collection from Santa Fé de Bogota. In size it fully equals, if it does not exceed, *O. dentatus* and *O. speciosus*, from which latter it differs in the total absence of any black on the throat.

2. NOTES ON AN UNNAMED PARROT FROM THE ISLAND OF ST. DOMINGO, NOW LIVING IN THE SOCIETY'S GARDENS; AND ON SOME OTHER SPECIES OF THE SAME FAMILY. BY PHILIP LUTLEY SCLATER, M.A.

(Aves, Pl. CXXVII.)

M. Auguste Sallé has called my attention to the fact, that the White-fronted Parrot of San Domingo, commonly regarded as the immature state of *Chrysotis leucocephala*, is in truth quite a different species from that bird. It may be distinguished at once by having no red on the throat and a narrower white frontal band than the true *leucocephala*, which is from Cuba. M. Sallé, who has had ample opportunities of observing this bird in its natural state, is confident as to its distinctness, and I have no doubt he is quite right. Under these circumstances, I propose to call the San Domingan bird, which has not yet received a specific designation, *Chrysotis Salléi*,—a just tribute to one who has made such extensive discoveries in the Natural History of the New World, and is the only modern naturalist who has explored the still imperfectly-known zoology of the island which it inhabits.

The true *Chrysotis leucocephala* is figured in Edward's 'Gleanings,' vol. iv. pl. 166, as "*The White-fronted Parrot*," and by Buffon in the 'Planches Enluminées' as the "*Perroquet à front blanc du Sénégal*," and "*Perroquet de la Martinique*," nos. 335 and 549. It is also well represented by Le Vaillant as the male of "*Le Perroquet à face rouge*" (pl. 107 et 107 bis). It is included in the revised list of Cuban birds lately published in Cabanis' Journal; and specimens in the collection of the Academy of Philadelphia were procured by Mr. Richard Taylor in that island.

Examples of this bird likewise occur in the British Museum, and there is a specimen now living in the Society's gardens.

The *Chrysotis Salléi* is figured by Buffon in his 'Planches Enluminées,' no. 548, as the "*Perroquet à ventre pourpre de la Martinique*." Specimens collected by M. Sallé in San Domingo are in the British Museum and at the Jardin des Plantes at Paris, and there are two fine examples now living in the Society's gardens.

There is likewise living in the Society's gardens an example of another nearly allied species of Parrot, which has also been sometimes confounded with the true *Chrysotis leucocephala*. This is the Red-fronted Parrot (*Chrysotis vittata*) figured in the 'Planches Enluminées' under the title of "*Perroquet de S. Dominique*," and often called by Gmelin's specific name "*dominicensis*." It is not,



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however, as far as I know, found in the island of Dominica, but in Puerto Rico, whence examples now in the Museum of the Jardin des Plantes at Paris were transmitted by Maugé. Le Vaillant has represented this bird as the female of his "*Perroquet à face rouge*."

Mr. Gosse's *Psittacus leucocephalus* from Jamaica, of which there is one specimen in the British Museum, seems different again, and ought probably to bear the name *Chrysotis vinaceicollis*; the bird described by M. de Lafresnaye as *Pionus vinaceicollis* (Rev. Zool. 1846, p. 321) being probably intended for the young of this; but a larger series of examples is perhaps requisite to confirm this species.

It is very interesting to notice how the different islands of the Antilles are thus tenanted by distinct, though corresponding, species of Parrots:—Cuba by *Chrysotis leucocephala* and *Conurus guianensis** (?), Jamaica by *Chrysotis vinaceicollis* and *Conurus nanus*, Puerto Rico by *Chrysotis vittata* and *Conurus maugæi*†, and San Domingo by *Chrysotis Sallæi* and *Conurus chloropterus*‡.

While upon the subject of Parrots, I may add some notes taken during a late inspection of specimens of these birds in several Museums.

Prince Bonaparte, in one of his last papers, proposed to call the little Mexican Conure, which so nearly resembles *Myiopsitta tigrina* of Souancé, *Bolborhynchus catharina* (Compt. Rend. March 1857). But there is no doubt that the Mexican bird (whether really distinct from the Venezuelan *tigrina* or not) should bear the name *lineola* of Cassin. Mr. Cassin's type, which is in the Philadelphian Academy's Museum, was obtained by Mr. Pease, near Puente Nacional, in the State of Vera Cruz, and there is no ground for supposing error in the locality. I have seen the same bird in the collection of Dr. Cabot of Boston. It was obtained by him in Yucatan, in the island of Cosumel in 1842.

The Parrots belonging to the genus *Tanygnathus* of the East Indian islands are in much confusion, which a more accurate knowledge of the localities whence specimens are brought would, I think, soon clear up. The type of the genus, *Tanygnathus macrorhynchus* (Pl. Enl. 713), distinguished by its enormous blood-red beak and green head, with the wings varied with black and yellow, is said to be from New Guinea. This is very likely to be the case, but more certain localities are the islands of Gilolo, where examples were procured by Forsten, and Ceram, where Reinwardt found it living, as I learn from the marked specimens in the Leyden Museum. Next to it comes *T. marginatus* (Pl. Enl. 287, fig. mala) from the Philippines. This species has the hind part of the head blue, and the wings varied with yellow and blue. A third bird of this genus is *Tanygnathus Mulleri*, Bp. Consp. p. 5, et Müll. et Schlegel, Verh.

* Probably not the true *guianensis* of Guiana, but so called by Cabanis, Journ. f. Orn. 1856, p. 106.

† *Psittacara maugæi*, Souancé, Rev. et Mag. de Zool. 1856, p. 59.

‡ *Psittacara chloroptera*, Souancé, Rev. et Mag. de Zool. 1856, p. 59.

Ned. Ov. Bez., Land en Volk. p. 108. The type specimen of this bird (which is in the Leyden Museum) was brought by Müller from the island of Bouton; but the same species occurs near Macassar, in the adjacent island of Celebes, whence Mr. Wallace has lately transmitted specimens; and living examples in the Zoological Gardens at Rotterdam are said to be from Timor.

We have now living in the Society's gardens examples of *Tanygnathus macrorhynchus* and *T. Mulleri*.

In our gardens we have also now living another very interesting bird, namely the large green Lory, described by Prince Bonaparte in a note in our 'Proceedings' in 1850 (p. 26) as *Psittacodis Westermanni*, and which may be easily distinguished from its near ally, the *Psittacus magnus* or *sinensis* of the older authors (of which we have also a living specimen), by the want of the red patch on the flanks, as well as by the different hue of the deep green colour. Prince Bonaparte has employed for these birds, which, as he well remarks, form the only green genus of true Lories, the term *Psittacodis*. But the true type of *Psittacodis* (as constituted by Wagler*, its originator) is the extraordinary Parrot, *Psittacus paragua*—a distinct form altogether, to which Prince Bonaparte has applied the name *Stavorinius*. Mr. G. R. Gray, in his last list of Genera (p. 88, genus 1491), applies the term *Mascarinus* to these Parrots. But Lesson's name *Mascarinus* cannot, I think, possibly be used otherwise than for the *Psittacus mascarinus* of Madagascar, which Lesson placed within the genus, although he did not arrange it as the first species. It seems quite absurd to call a group of birds occurring only in the Moluccas "*Mascarinus*." I therefore suggest the adoption of the term "*Polychlorus*," given by Scopoli as the specific designation of *Psittacus magnus*, as a generic name for these birds—which will so stand as *Polychlorus magnus*, and *Polychlorus Westermanni* (Pl. CXXVII.); and the third species, Prince Bonaparte's *Psittacodis intermedius*, of which there are examples in the British and Leyden Museums—as *Polychlorus intermedius*.

It is singular that the only other known example of *Polychlorus Westermanni*, from which Prince Bonaparte's description was taken, is also a living bird in the Zoological Gardens of Amsterdam, where the collection of *Psittacidae* (which I had the pleasure of inspecting a few weeks since) is very good, embracing about sixty-four species.

It is however surpassed by that in our own Gardens, where at the present moment no less than seventy-five species may be seen living.

3. ON A COLLECTION OF BIRDS RECEIVED BY M. SALLÉ FROM SOUTHERN MEXICO. BY PHILIP LUTLEY SCLATER, M.A.

M. Sallé (whose fine series of Mexican birds I have twice already brought before the notice of this Society) has lately received a third

* Wagler, Mon. Psittacorum, p. 495.

collection from the same country, which he has kindly submitted to my inspection. This was made in the district of S. Andres Tuxtla in the State of Vera Cruz, by M. Adolphe Boucard, and embraces nearly 80 species contained in M. Sallé's previous collection, of which I need not repeat the names. But there are also other species in this last collection which did not occur in either of the former, and I purpose giving some account of these, so as to make the catalogue of South Mexican birds as perfect as possible.

1. *SARCORHAMPHUS PAPA* (Linn.).

Although this bird has been described by Hernandez as Mexican, I am not aware that its occurrence in any of the States of the Mexican confederacy has been noticed by any modern writer. Some of the United States ornithologists have claimed it as occurring within their territories, but, I believe, on insufficient grounds.

2. *MORPHNUS URUBITINGA* (Gm.).

3. *MORPHNUS ANTHRACINUS* (Nitzsch).

A young bird of the second year.

4. *MORPHNUS SCHISTACEUS* (Sund.), juv.

Santecomapam.

5. *ASTURINA NITIDA* (Lath.).

A young bird. Santecomapam.

6. *BUTEO GHIESBREGHTI*, DuBus, Esq. Orn. pl. 1.

A fine adult bird of this splendid species.

S. Andres Tuxtla.

7. *CICCABA TORQUATA* (Daud.): Bp. Consp. p. 43.

Santecomapam; the forests—scarce.

8. *TROGON MELANOCEPHALUS*, Gould, Mon. Trogon. pl. 12.

Beautiful specimens of males and females of this rare species procured at Cateman in November and December 1856.

9. *CERYLE SUPERCILIOSA* (Linn.).

Agrees with S. A. specimens.

10. *PHAETHORNIS LONGIROSTRIS*, Delattre, Echo d. M. S. 1843, no. 45.—*T. cephalus*, Bourc. et Muls. R. Z. 1848, p. 269.

This fine species was originally discovered in Nicaragua by Delattre, and specimens were obtained in the same country by M. Sallé during his former voyage.

11. *VIREO FLAVIFRONS*, Vieill. Ois. Am. Sept. pl. 54.

12. *VIREO NOVEBORACENSIS* (Gm.).

Both these Greenlets from Santecomapam. They were collected in January 1857, and seem to agree with specimens from the United States.

13. *ATTILA CITREOPYGIA*, Bp. Notes Orn. p. 86.

This species, which was established by Prince Bonaparte on specimens brought by Delattre from Nicaragua, is closely allied to *A. brasiliensis* of Brazil and *A. spadicea* of Cayenne (*uropygialis*, Cab. in Schomb. Guiana). It may be distinguished by its dark brown back, and the darker flammulation of the neck. Two specimens were obtained at Santecomapam in March 1857. It is represented as migratory and very rare—found only in the deep forests, and perched very high in the trees.

14. *ICTERUS GULARIS* (Wagl.); Bp. Consp. i. p. 435; P. Z. S. *antea*, p. 205.

Specimens of this species of a deeper reddish hue than any I have yet seen from S. Andres Tuxtla in March 1857.

15. *ICTERUS GIRAUDI*, Cass. (*melanopterus*, Hartlaub); Bp. Consp. i. p. 434.

At one time I was inclined to agree with Prince Bonaparte (Notes Orn. p. 13) that these two names might belong to different species. Having lately examined individuals from different localities, I think otherwise. The type-specimens of Mr. Cassin in the collection of the Academy at Philadelphia and those from Bogota only vary slightly in the amount of yellow on the bend of the wing, and can hardly be considered distinct. The present examples from Santecomapam, obtained in January, are rather longer in the wing than the Bogota skins, but otherwise agree.

With the five species previously mentioned, the present two make up seven *Icteri* inhabiting the province of Vera Cruz, and I have specimens of an eighth (*I. Wagleri*, mihi, P. Z. S. 1857, p. 7) from Orizaba in the same State. I have also seen *Icterus parisorum*, Bp. (*scottii*, Couch.), from Coahuila, and *I. pustulatus* from Mazatlan in Northern Mexico; so that this portion of America may be considered as the head-quarters of the brilliant birds of this genus.

16. *OCYALUS WAGLERI*, Gray, Gen. B. p. 342. pl. 85.

The most northern locality I have hitherto noticed for this species. It is common in Guatemala, whence specimens have been sent by Mr. Skinner; there are examples in the British Museum from Chiriqui (Capt Kellett), and the bird appears to extend into New Grenada.

17. *GONIAPHÆA PARELLINA* (Bp.); P.Z.S. 1856, p. 302. sp. 149.18. *GONIAPHÆA CONCRETA* (DuBus), *ibid.* sp. 150.

The present collection contains males and females of both these

interesting species, obtained at Santecomapam in January 1857. The females of the latter bird are of a uniform chocolate-brown, quite different in tinge from those of the other species of the genus. I have in my collection a male of *G. concreta* from Orizaba.

19. *EUPHONIA GOULDI*, mihi, P. Z. S. 1857, p. 66. pl. cxxiv.

A male of this beautiful *Euphonia* from Santecomapam in January 1857, which confirms my impression that the bird in Sallé's original collection, described as a probable female (P. Z. S. 1856, p. 303. sp. 168), was of this species. Among some drawings of birds made by Mr. Bell on the Mosquito Coast, is an accurate representation of the ♂ and ♀ of this species, which indicates the extension of its range further southwards.

20. *LANIO AURANTIUS*, Lafr. P. Z. S. 1856, p. 303, sp. 158.

The present collection contains several males of this splendid bird from Santecomapam, obtained in March 1857. The former collections contained only a single female.

21. *CELEUS BADIOIDES* (Less.) ; Cent. Zool. pl. 14 ; Bp. Consp. p. 130.—*Meiglyptes badius*, Reichb. !

"Very rare at Cuesalapa and Santecomapam, in the forest. Migratory. January 1857."

22. *CENTURUS PUCHERANI* (Mahl.) ; Bp. Consp. i. p. 120.

Santecomapam, March 1857.

My collection contains an example of this species from Orizaba.

23. *DRYOCOPUS GUATEMALENSIS*, Hartl. — *Dryocopus regius*, Reichb. Handb. d. Sp. Orn. pl. 649. fig. 4331-32. p. 393.

Santecomapam, March 1857.

This same bird was in M. Sallé's first collection, and was wrongly inserted in my list (P. Z. S. 1856, p. 306. sp. 197) as *D. erythrops*. The true *D. erythrops* is from Brazil. The other Mexican species, *D. scapularis* of my list, has also been figured by Reichenbach as *D. leucorhamphus*, pl. 648. p. 393.

24. *DIPLOPTERUS EXCELLENS*, sp. nov.

Similis D. nævio ex Amer. Merid. sed major, supra magis rufescens, caudæ tectricibus superioribus cinnamomescenti-rufis nigro longitudinaliter striatis: subtus purius albus, pectore non cinerascente, sed paululum rufo tincto: crisso rufescente: rostro brevior, altiore; tarsis longioribus.

Long. tota 11.7, alæ 4.5, caudæ 6.3, tarsi 1.4.

M. Jules Verreaux, whose experienced eye is ever active in distinguishing new species, called my attention to this bird of M. Sallé's last collection, after I had somewhat doubtfully referred it to *D. nævius*. Upon a close re-examination it certainly appears distinct from the South American species, and I have set forth above the grounds of difference, though I have some doubts whether the pre-

vailing rufous tinge of the back may not be owing to the bird being not quite adult. I have not adopted the term *mexicanus*, which M. Verreaux has used for this species in his MS. as we have already a *Dromococcyx mexicanus*, which is of a genus not separated by many authors from *Diplopterus*.

25. CONURUS PETZI (Wagl.).—*Sittace petzi*, Wagl. Mon. Psitt. p. 650.

Acapulco.

This species very closely resembles the South American *C. aureus*. I have already mentioned three parrots as occurring in M. Sallé's collections, namely *Pionus senilis* and *Psittacula lineola* (P. Z. S. 1856, p. 306) and *Chrysotis autumnalis* (*antea*, p. 205). This makes a fourth. Besides these M. Sallé found *Chrysotis viridigenalis*, Cassin (Pr. Ac. Sc. Phil. vi. p. 371; Journ. iii. pl. 13. p. 153), which seems to be the same as Souancé's *C. coccineifrons* (R. Z. 1856, p. 154) common in the *tierra caliente*, as also *C. ochroptera*, Gm., (*xanthops*, Spix). In the same country M. Sallé observed *Conurus astec*, Souancé (R. Z. 1857, p. 97), and two *Aras*, one of which was most likely *Ara militaris*, known to occur in Mexico. These ten species are probably all that occur in this part of Mexico. But on the table-land is found *Rhynchopsitta pachyrhyncha*, which extends up to the Rio Grande, where it was obtained by John Audubon within the limits of the State of Texas.

26. NYCTICORAX GARDENI (Gm.).

Cateman, December 1856.

27. CANCROMA COCHLEARIA (Linn.).

Cateman, January 1857.

28. IBIS ALBA (Linn.), juv.

Santecomapam, March 1857.

29. CALIDRIS ARENARIA (Linn.).

Santecomapam, January 1857.

4. LISTE DES OISEAUX RAPPORTÉS ET OBSERVÉS DANS LA RÉPUBLIQUE DOMINICAINE (ANCIENNE PARTIE ESPAGNOLE DE L'ÎLE ST. DOMINGUE OU D'HAÏTI), PAR M. A. SALLÉ, PENDANT SON VOYAGE DE 1849 À 1851. (Communicated by PHILIP LUTLEY SCLATER.)

M. A. Sallé has at my request drawn up the following list of birds met with by him in the island of San Domingo, together with some interesting observations on their habits. We know so little of the ornithology of this interesting island (and indeed of the Antilles gene-

rally, except Jamaica and Cuba), except from the older writers, that any addition to our information will I am sure be acceptable. I have taken some pains in the verification of the nomenclature of M. Sallé's list, and have added a few observations on this subject and on the range of the species.

1. TINNUCULUS SPARVERIUS (Linn.).

On le nomme vulgairement *Cernicaro* ; il est assez commun dans les plaines de Nisao ; se pose sur les buissons.

2. ATHENE DOMINICENSIS, Bp. Consp. p. 38.

Cucu, vit dans des terriers creusés dans les berges, aubord des chemins ; l'ouverture est garnie de fiente de cheval ; lorsqu'on passe il sort et se met à l'entrée du terrier et fait la révérence.

3. VIREO ALTILOQUUS, Vieill.

4. GALEOSCOPTES PLUMBEUS (Linn.).

Aux environs de S^{to} Domingo. •

(This species must not be confounded with *G. rubripes* of Cuba. It is more like a Thrush than a Mocking-bird in its habits, according to M. Sallé.—P. L. S.)

5. SEIURUS AUROCAPILLUS (Linn.).

Se trouve dans les jardins, où il vit de fruits et d'insectes.

6. SETOPHAGA RUTICILLA (Linn.).

Dans les bois, où elle chasse les insectes.

7. SYLVICOLA PALMARUM (Vieill.).

8. SYLVICOLA CORONATA (Linn.).

9. SYLVICOLA CANADENSIS (Linn.).

Dans les montagnes couvertes de pins de l'intérieur de l'île.

10. SYLVICOLA PENSILIS (Gm.).

11. SPINDALIS MULTICOLOR (Vieill.).

Très rare ; je n'ai tué que 3 ou 4 ind. dans les gorges des montagnes dans l'intérieur de l'île sur des arbres élevés ; il a un chant agréable.

12. LOXIGILLA VIOLACEA (Linn.).—*Pyrrhulagra violacea*, Bp. Consp. p. 493.

On le nomme *Gallito* ; il est rare, et vit de grain dans les fourrés et terrains en friche.

(Quite distinct from *Loxigilla portoricensis* ex Porto Rico.—P. L. S.)

13. EUPHONIA MUSICA (Linn.).

Sur les grands arbres dans les gorges des montagnes ; le chant en

est magnifique et très fort, ou le nomme *Sirguero* : c'est le nom espagnol du Chardonneret.

14. *DULUS DOMINICUS* (Linn.).

Me semble ne pas s'éloigner des *Saltator* : voir la Rev. Zool. 1851, p. 583.

15. *PHÆNICOPHILUS PALMARUM* (Linn.).

Cet oiseau est mal nommé Palmiste, car il ne fréquente pas les palmiers; il paraît avoir été confondu avec le *Dulus*: on le nomme *Sigua de cabeza prieta*; il vit isolé dans les petits bois ou taillis voisins des lieux habités; il se réunit par paire au printemps pour nicher, et fait son nid bas avec des brins d'herbes.

16. *MIMUS DOMINICUS* (Linn.).

On le nomme *Risenseñor*; il se tient dans les plaines et niche sur les petits arbres.

17. *TYRANNUS INTREPIDUS* (Linn.)?

18. *TYRANNUS MATUTINUS*, Vieill.

Oiseaux très querelleux et méchants envers les autres oiseaux; on les nomme *Pijir*.

19. *CYPSELUS CAYENNENSIS*, Gm. ?

Vol très haut et en grand nombre après la pluie et surtout l'après midi.

20. *PROGNE DOMINICENSIS* (Gm.).

Golondrina.

21. *PHONIPARA OLIVACEA* (Linn.).

"*Juan amaruco*," dans les plaines et dans les broussailles.

22. *ICTERUS DOMINICENSIS* (Linn.).

Il fait son nid sur les feuilles de Palmier; c'est un tissu très clair et très fin, mais il ne pend pas en bourse, comme celui d'autres espèces du continent; on le nomme "*Sigua amarilla*;" on le tue aux environs de la ville de S^{to} Domingo, mais pas très commun.

23. *QUISCALUS BARITA* (Gm.).

On le nomme *Chonclino*, et on le trouve partout aux environs des habitations.

24. *CORVUS LEUCOGNAPHALUS*, Daud. Tr. d'Orn. ii. p. 231.

Il se trouve dans les grands bois et a le cri comme le nôtre; on le mange après en avoir ôté la peau; on le nomme *Cuerbo*.

25. *CORVUS JAMAICENSIS*, Gm.; Bp. Cons. p. 385.

On le nomme *Cao*, qui est son cri sur différens tons; c'est un

oiseau insupportable par son cri, et il sort par bandes de 8 ou 10 ind. et poursuit les voyageurs avec acharnement, et même les animaux en criant; on le trouve dans les lieux secs de l'île entre Bany et Azua.

26. *CERTHIOLA* — ?

Sur les fleurs des Agaves.

27. *LAMPORNIS AURULENTA* (Vieill.).

Sur les fleurs de Cactées.

28. *SPORADINUS ELEGANS* (Aud. et Vieill.).

Dans les montagnes de l'intérieur, sur les fleurs des arbres (*Inga*).

29. *MELLISUGA MINIMA*.

Dans les clarières sur les fleurs. Voir Rev. Zool. 1849. p. 498.

30. *CERYLE ALCYON* (Linn.).

(—Reichenbach suspects that this species is different from *C. alcyon*, and calls it *domingensis*, Handb. d. Sp. Orn. p. 26.—P. L. S.—)

31. *TODUS DOMINICENSIS*, Lafr. Rev. Zool. 1847, p. 331.—*T. subulatus*, Gould.—*T. angustirostris*, Lafr. Rev. Zool. 1851, p. 478.

Je crois ces trois espèces des âges et sexes différent de la même oiseau.

On le nomme *Barancoli* ou *Baranquero* à cause de son habitude de creuser son nid dans les berges ou falaises des *Barrancas* (précipices). On le trouve par toute l'île; il se perche sous le bois sur des branches basses; il se tient triste, le bec haut, le cou ramassé et tournant stupidement et lentement la tête, de temps en temps il s'envole brusquement à la poursuite des insectes; il a un vol très court et très rapide; il fait un bruit particulier avec ses ailes, comparable à celui produit par une feuille de parchemin à laquelle on imprimerait une forte secousse; il fait aussi claquer son bec d'une force extraordinaire. Au printemps ces oiseaux se réunissent par paire; les ♂ se battent en faisant claquer leur bec et se poursuivent avec acharnement; quand ils font la cour à leur ♀, on les voit prendre toutes sortes de positions, hérissier les plumes, gonfler la gorge, laisser traîner les ailes à la manière du Dindon faisant la roue, et les agitant de temps en temps pour faire du bruit; si la ♀ fuit, le ♂ la poursuit. Cet oiseau niche dans les *Barancas*, ou il y a éboulis produit par les eaux; là dans un petit trou à forme évasé et rond intérieurement il y fait son nid. J'ignore si le trou a été complètement creusé par l'oiseau (les gens du pays l'affirment) mais évidemment l'intérieur a été amélioré et il y a des petites herbes sèches; pendant que l'un des sexes est dans le trou on voit ordinairement l'autre veillant, perché presque à l'entrée, soit sur une petite racine ou une petite liane pendante; il niche aussi dans les trous des rochers. Il

se nourri dans la manière et a un peu l'habitude des Jacamars (*Galbula*).

32. *CENTURUS STRIATUS* (Lath.), Bp. Consp. p. 119.

On le nomme *Carpintero* ; il est assez commun aux environs de la ville de S^{to} Domingo. J'en ai tué un ayant une larve de Diptère parasite (*Aricia pici*). Voir Ann. de la Soc. Entomologique de France, p. 657, 1853.

33. *CHLORONERPES PASSERINUS* (Linn.).

Très rare dans les forêts de l'est près d'Higüey.

34. *SAUROTHERA DOMINICENSIS*, Lafr.

35. *SAUROTHERA VIEILLOTI*, Bp. Consp. p. 97.

Ces sont des oiseaux peu farouches, qui sont presque toujours à terre, courants très vite dans les buissons à travers les haies et se nourrissant des lézards et des insectes. On les nomme *Pajaro bobo*.

36. *COCYZUS DOMINICUS* (Linn.).

37. *COCYZUS SENICULUS* (Lath.).

(In the Paris Museum, from Guadeloupe, Martinique and Porto Rico.—P. L. S.)

38. *CROTOPHAGA ANI*, Linn.

Très commun dans les plaines ou terres en friches ; on les nomme *Judio* à cause de leur cri, qui produit ce nom.

39. *BUCCO CAYENNENSIS* ?

(*Tamatia de St. Domingue.*) Tué un seul dans des grands bois sombres.

(I do not know what bird this can be.—P. L. S.)

40. *CHRYSOTIS SALLÆI*, Sclater, *antea*, p. 224.

Différent de celui de Cuba cet oiseau est un peu plus gros et n'a pas autant de rouge sous la gorge, &c. ; on les nomme *Cotora* ; ce n'est que le matin et le soir qu'on les voit voler comme les Pigeons à des très grandes distances à la recherche de leur nourriture ; ils se tiennent très loin des villes, et durant tout le jour, pendant la chaleur, ils sont occupés à manger sur les arbres. Mais comme ils sont très babillards de leur naturel, c'est là ce que les fait découvrir parmi le feuillage, car, s'ils étaient silencieux, le chasseur les découvrirait difficilement à cause de leur couleur ; leur chair est assez bonne à manger, quoique ferme.

41. *CONURUS CHLOROPTERUS*. — *Psittacara chloroptera*, Soudancé, Rev. et Mag. de Zool. 1856, p. 59.

Je n'ai tué qu'une seule de cette Perruche dans les grands bois de l'intérieure de l'île ; elle y est donc rare.

42. TROGON ROSEIGASTER, Vieill.

Se tient sur le haut des plus grandes montagnes de l'intérieur de l'île ; ils sont en bande d'une 10^e, et ont un chant plaintif ; en l'imitant on les fait venir à portée pour les tirer ; ils se perchent sur les plus grands arbres, et mangent des baies assez grosses et qu'ils avalent entières. Ils font leur nids dans des vieux trous des *Pics*, en en perçant un autre du côté opposé ; les œufs sont blancs et arrondis. On les nomme *Piragua*.

43. COLUMBA LEUCOCEPHALA, Linn.

Toute l'année ce Pigeon se trouve au marché de Santo Domingo, ou à cause de son abondance il se vend à un prix si modique qu'on peut le considérer comme une véritable manne pour les habitants de ce pays. On les tue 1^o, au vol à la passée, car tous les matins ils passent au dessus de la ville, allant manger dans l'ouest, et tous les après midi ils repassent allant se coucher dans l'est ; 2^o, au moyen d'appaux faits de beaux échantillons préparés, et séchés au four, avec des morceaux de bois mis à l'intérieur pour les soutenir. On les attache on bout d'une perche, au sommet des arbres dont ces pigeons recherchent les fruits et bientôt des bandes aperçus la tête blanche de l'appau, viennent s'abattre comme des flèches sur l'arbre au-dessous duquel se trouve le chasseur, qui les tire à son aise. Ils nichent vers le mois de mars et alors vivent par paire isolés dans les bois ; en Avril elles se réunissent en bandes considérables jusqu'au Octobre ; on les nomme *Paloma*.

44. COLUMBA CORENSIS, Gm.

Vit dans les montagnes de l'intérieur de l'île dans l'épaisseur des forêts vierges et se tient au sommet des arbres dont il mange les baies ; ils sont recherchés par les chasseurs, étant un excellent gibier ; on les nomme *Paloma morada*.

45. LEPTOPTILA — ?

Qu'on nomme *Torcasa* ; elle ressemble un peu à la *Leptoptila ru-faxilla*, vit isolée dans les bois sur les chemins, souvent à terre.
(This is perhaps *Leptoptila jamaicensis* (Linn.).—P. L. S.)

46. ZENAIDURA CAROLINENSIS, Bp. Consp. ii. p. 84. ?

On la rencontre dans les plaines par petite bande de 5 à 6 ; elles se perchent à l'ombre des Gayacs.

47. GEOTRYGON MONTANA (Linn.).

On les appelle *Perdrix* et on distingue la rouge et la grise ce qui est le ♂ et ♀. Elles habitent dans les montagnes couvertes des forêts épaisses et solitaires, elles se tiennent à terre et cherchent leur nourriture sous les bois sans jamais s'écarter dans les champs pour y vinre des grains cultivés. Elles font leur nid à hauteur d'homme et souvent plus bas, et elles sont tristes et silencieuses comme les forêts sombres ou elles vivent.

48. CHAMÆPELIA PASSERINA (Linn.).

On la trouve dans les plaines et sur les chemins suivant les sentiers et aussi dans les champs cultivés.

49. NUMIDA MELEAGRIS.

Originnaire des côtes d'Afrique elle y est devenue sauvage, ainsi que d'autres animaux domestiques (Bœufs, Pores, Abeilles, &c.), par la paresse des habitants, les révolutions dont cette île a été souvent le théâtre, et surtout par le manque de soins dont ces animaux sont l'objet. Elles sont assez nombreuses dans les endroits secs et sablonneux au nord et au sud de l'île, surtout entre les villes de Bany et San Juan de la Maguana, Santiago et Monte Cristo, où elles trouvent un refuge assuré parmi le grand nombre de Cactées qui couvrent ces plaines ; elles perchent le soir à la cime des plus grands arbres. Elles sont très difficiles à chasser et sont très méfiantes, aussi on ne peut les tuer qu'avec des chiens ou à cheval, se laissant approcher des animaux. Elles diffèrent de la domestique par sa taille plus petite et ses pattes noires ; sa chair excellente la fait rechercher ; on les nomme *Guinea*.

50. HERODIAS LEUCE (Ill.).

On les nomme *Garza blanca*.

51. HERODIAS CANDIDISSIMA (Gm.).

52. BUTORIDES VIRESCENS (Linn.).

Garza morada.

53. PHENICOPTERUS RUBER (Linn.).

Je ne l'ai pas tué mais vue près la *Laguna de Neiba*.

54. ÆGIALITES VOCIFERUS (Linn.).

Commun dans les plaines humides, au bord des marais ou des ruisseaux ; il court très vite, et pousse un cri perçant en s'envolant ; on le nomme *Frailecito*.

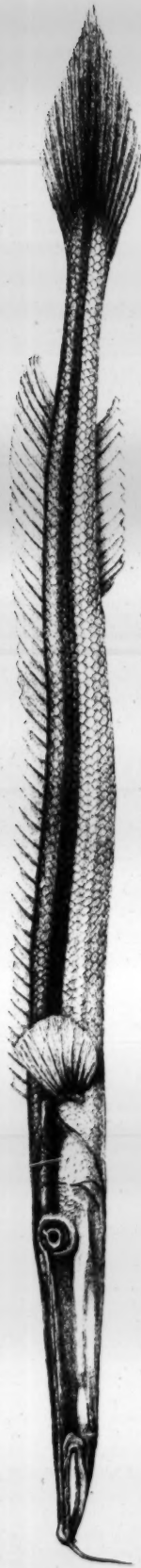
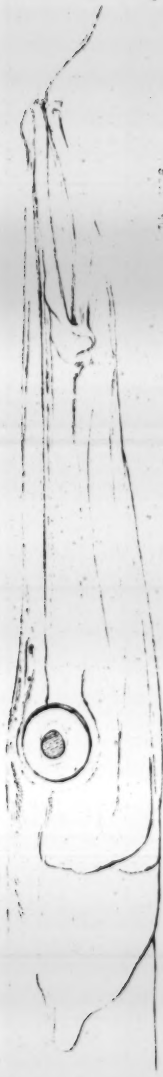
55. ARAMUS SCOLOPACEUS, Vieill.

Se promène sous les arbres dans les forêts sombres et humides, où il vit de petits reptiles, mais surtout des mollusques, dont il rompt la coquille pour en extraire l'animal. Il perche le soir au sommet des grands arbres près des ruisseaux, et de là après le coucher du soleil durant la nuit et avant le lever du soleil il fait retentir les bois de son cri fort et sonore. On les appelle *Carao*, sans doute à cause du cri, qui est analogue.

56. RALLUS —.

Petit, se tenant dans les roseaux.

5 00 58



1/2 length

SIPHONOGNATHUS ARGYROPHANES Pinnocsm.

W. West Imp.

GE. Ford

57. GALLINULA GALEATA, Licht.

À l'embouchure de la rivière Jayna sur les plantes aquatiques qui flottent sur la rivière dont le courant est insensible.

58. PODICEPS DOMINICUS, Linn.

Dans les marais dans les plaines près Higney ; on le nom *Zambulidor*.

59. HIMANTOPUS MEXICANUS.

Id.

60. QUERQUEDULA DISCORS.

Id. On le nomme *Pato*.

61. SULA FUSCA (Linn.).

Sur le bord de la mer dans les lieux déserts.

5. ON SIPHONOGNATHUS, A NEW GENUS OF FISTULARIDÆ. BY SIR JOHN RICHARDSON, F.R.S., Hon. F.R.S.E. ETC.

(Pisces, Pl. VI.)

SIPHONOGNATHUS, gen. nov.

Facies elongata, fistulosa, Aulostomatum, ex osse nasali et frontali, ossibusque palatinis, preoperculis, pterygoideis cum tympanicis productis formata. Præmaxillaria sub lateribus ossis nasalis, fere immobilia. Rictus oris mediocris, horizontalis in rostro extremi, motu solo cardinali mandibulæ subincurvæ aperiens et claudens. Maxillæ pars descendens, gracilis in disco parvulo subrotundo ad angulum oris expansa. Labia præmaxillaria et mandibularia arcata, super ossa propria replicata : priora ex utroque latere ante os nasali approximantia coalescentiaque et filamentum parvulum, impar, terminale, gracile præ ore instar proboscidis dependens, efficientia.

Foramina narium utrinque bina in acie faciei ad oculum approximata : apertura anterior, operculata vix oculo nudo discernenda, posteriori hianti nec marginatæ vicina. Dentes omnino nulli. Pharynx angusta, lævis. Cranium nec cristatum nec spinosum. Apertura branchialis obliqua, infra antrorsum tendens. Ossa branchiostega quatuor utrinque, gracilia. Branchiæ quatuor. Vertebrae costiferae 29-30 circiter. Costæ breves, graciles. (Vertebrae caudales non numeratæ.) Anus pone medium.

Squamæ cyclodei læves, orales, in tempora, genas et occiput currentes ; vultus esquamosus, lævis. Forma corporis elongata, subcylindrica ; caudæ pyramidata.

Pinnae ventrales nullæ. Pinna caudæ cordato-lanceolata, acuminata. Pinnae pectoris radiis paucis apicibus simplicibus,

*planis non dilatatis. Radii anteriores pinnae dorsi, elastici, non pungentes, nec tamen articulos ostendentes. Pinnae an-
 radius primus eodem modo subspinosus. Radii omnes pin-
 narum simplices membrana tenui connexi.*

*Intestina simplex, sine versura recte in anum tendens; dilatatio
 ventriculi parva. Cæca pylorica nulla nobis detecta. Vesica
 pneumatica ampla.*

SIPHONOGNATHUS ARGYROPHANES.

In general form this fish approaches *Aulostoma*, the structure of the head and the tubular elongation of the palate and os hyoides being similar. The body is less compressed, being roundish, but yet with somewhat flattened sides, and a slight tapering towards the anus. The compression increases in the tapering tail. As in *Aulostoma*, the great length of head is due to the prolongations of the prefrontals, palatines, vomer, nasal, pterygoids, tympanics and hyoid bones, constituting a tube terminated by the horizontal opening of the mouth. The premaxillaries form the upper border of the mouth, and have little or no motion. They conceal the slender limb of the maxillary, but the irregularly triangular or small suborbicular plate of the latter protects the corner of the mouth. Equal in length to the maxillaries, the mandible is articulated to the extremities of the tympanics, and is slightly curved, producing a lateral gaping when the mouth is closed. Both it and the premaxillaries are edged by narrow lips which fold back on the limbs of their respective bones. At the extremity of the snout the premaxillary lips unite to form a fine awl-shaped proboscis-like barbel, which hangs down before the mouth. No teeth whatever could be discovered in the jaws or in the tubular mouth,—not even in the pharynx, which is narrow. Form of the head a slender four-sided obelisk, the space between the eyes being occupied by the forked mid-frontal into which the nasal is dovetailed. The latter as it runs forwards is feebly convex, and shows a smooth and scarcely prominent medial line, which terminates in the slightly swelling extremity of the bone and of the snout. Under each edge of the nasal, the long slender premaxillary appears as already mentioned. On the sides, the facial tube is completed by dark brown membrane, and on the ventral surface also a membrane stretches from the interopercula and tympanics of one side to those of the other, being supported on the mesial line, interiorly by a very slender lingual bone, which is neither prominent nor covered with flesh so as to form a tongue. Continuous with this under-surface of the mouth follows the branchiostegous membrane, whose deeply crescentic distal edge makes no flap at the isthmus to which it is attached. Four slender, moderately long, elastic branchiostegals support the membrane on each side. One specimen, it may be noticed, has only three branchiostegals on the right side. The gill-plate is connected to the nuchal region by scaly membrane, and terminates in a small flexible strap-shaped apex, above which only a small corner of the gill-opening appears, nine-tenths of the opening being below it.

No bony crests or spinous points exist on the cranium. The nostrils are on the edge of the head, close before the eye, the hinder one being an open pore, not above a line from the orbit, and the other is situated a quarter of an inch before it in a pulpy membrane, and being closed by a flap is not very perceptible. The space between each pair is of course equal to the breadth of the head in that region.

Scales cycloid, oval, most of them oblique, or unequal at the base, of moderate size and delicate texture, showing very fine concentric lines of structure, and from five to fifteen faint basal grooves. Scaly integument covers the upper half of the operculum, and also a rectangular space bounded anteriorly by the vertical limb of the preoperculum and the eye. On the top of the head the scales end by a crescentic line, whose ends touch the angles at the eye. The facial part of the head is clothed with scaleless integument, and there are many pores and mucous canals extending along the under edge of the prefrontal. A soft tubular ring supplies the place of suborbital bones, and the small preorbital scale bone is almost membranous, but becomes rough in drying, from the number of mucous canals which run through it. Between the gill opening and the caudal fin, there are 102 scales in a longitudinal row, six rows above the lateral line, and nine below it. The lateral line is formed by a row of small pores, each placed on the tip of a small scale, of whose disk little appears, because of the overlapping of the adjoining scales above and below. A taper-pointed scale terminates the scaly integument on the base of the caudal on each side.

Fin-rays.—Br. 4—4; D. 23|23, last two approximated at the base; A. 2|13, last two approximated at the base; C. 17; P. 10; V. 0. Dorsal commencing over the bones of the pectorals and just behind the tips of the gill-covers. It runs considerably past the anus, and some way further than the anal, its outline being even, though rising slightly in its course. Its rays are simple and unbranched like those of the other fins (except the caudal), and half of them are without visible joints, elastic at the base and tapering with flexible points. The anal commencing near the anus does not reach so far down the tail as the dorsal. It is composed of similar rays, and in the anterior two the joints are obsolete. The caudal, semilanceolate at the base, tapers to a slender, very acute point. Its rays are sparingly divided at the tips. Pectorals supported by ten simple rays with flattened but not dilated tips. No ventrals.

The intestines of the smaller specimen were examined, but not satisfactorily, as they had received injury, particularly the air-bladder, from a glass rod that had been thrust down the throat of the fish. The alimentary canal is quite straight and simple, with a slight widening below the œsophagus, but no defined stomach. No pyloric cæca were detected. The inside of the gut was thickly lined by a fine, flocculent mucus-like matter, and on scraping it away a multitude of longitudinal striæ were seen extending along the inner membrane. The liver, partly perished, was on the right side, and did not descend far. Air-bladder torn, so that its size and form

could not be ascertained. It appeared to have been large, and its coats to have been soft, fibrous, and nacry, and though thick, very readily torn. The melt was enclosed in a delicate capsule with a long seminal duct.

Under the lateral line there is a bright silvery stripe extending the whole length of the fish, and above it a stripe of equal breadth of a brownish-purple colour. This stripe reaches the tip of the caudal in one direction, and in the other passes over the upper part of the gill-cover, along the sides of the head to the mouth. Above, the back is of a lighter brown, and along the base of the caudal there is a purplish-black line. These colours are described as they exist after two or three years of maceration in spirits, and they have doubtless undergone alteration since the fish was taken.

Science is indebted for this novel and highly interesting form of fish to the late Captain Sir Everard Home, who never lost an opportunity of adding to our Natural History collections. He obtained it in King George's Sound. Some half-digested pieces of fish were found in the mouth, but nothing except mucus in the intestines.

Dimensions.

	Inches.
Length from tip of the snout to extremity of caudal, exclusive of rostral barbel.	16.50
— from tip of the snout to tip of the gill-cover.	4.80
— from tip of the snout to fore-edge of the orbit	3.00
— from tip of the snout to anus	10.00
Distance between the orbits.	0.38
Length of diameter of the eye	0.45
— of rostral barbel	0.62
— from posterior angle of the eye to the tip of the gill-cover.	1.43
— of the opening of the mouth	1.10
Height of the head behind the preoperculum.	0.65
Greatest breadth of shoulders or nape	0.70
Height of body behind the pectorals	1.00
Length of naked space between dorsal and caudal	2.00
— of caudal fin.	2.50
— of attachment of anal fin.	1.80
— of pectorals	0.95
Height of posterior dorsal rays	0.80

November 24, 1857.

John Gould, Esq., F.R.S., V.P., in the Chair.

The following papers were read :—

1. ON FOUR NEW SPECIES OF MUS AND ONE OF HAPALOTIS FROM AUSTRALIA. BY JOHN GOULD, F.R.S., V.P., ETC.

Mr. Gould alluded to the prevailing opinion that none but Marsupial animals were to be found in Australia, and observed that this opinion may be correct to a certain extent, yet the *Placentalia* are well represented in that country by numerous species of the genera *Hapalotis*, *Mus*, &c.; and remarked that in few countries are the smaller members of the *Rodentia* more abundant both in species and individuals. It is to this latter order that the four new species now exhibited by him pertain.

For the first of these he proposed the name of *Mus assimilis*; this animal is about the same size as the *Mus decumanus* of Europe, and has a very similar aspect; its hair, however, is more soft and silky, and its incisor teeth very long and narrow.

. MUS ASSIMILIS.

Face, all the upper surface and sides light brown, very finely pencilled with black; under surface greyish-buff, the base of the fur all over the body dark slaty-grey; whiskers black; tail nearly destitute of hairs; all the feet clothed with very fine silvery-white hairs.

Total length from nose to base of tail....	7 $\frac{1}{4}$ inches.
———— of the tail	6 „
———— of fore-arm	1 „
———— of the tarsus and toes.....	1 $\frac{1}{4}$ „

Remark.—The minute silvery-white hairs of the feet give these organs a very delicate appearance; yet they are not positively white, neither are they brown.

The two specimens from which the above description was taken and to which the remarks refer are from the banks of the Clarence in New South Wales, where they were procured by the late Mr. Strange. Three other specimens collected by Mr. Gilbert at King George's Sound differ only in being about a fifth smaller in all their admeasurements; it is just possible that it will hereafter be found that these latter animals are distinct from the former, but at present they are regarded as identical; and if such be the case, the range of the species extends along the whole southern sea-board of the continent from east to west.

The second species is a short robust, compact Rat, equal in size to the common Water Vole of England (*Arvicola amphibius*), but rather smaller than the *Mus fuscipes* of Australia. It is in every

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respect a true *Mus*, and is an inhabitant of the open plains of Darling Downs, New South Wales; its incisor teeth, when compared with those of *M. assimilis*, are broad and less elongated; its hair also is coarser, and more wiry. Its colouring is as follows:—

MUS SORDIDUS.

Head, all the upper surface, and flanks clothed with a mixture of black and brown, the former hue prevailing along the centre of the back, and both nearly equal in amount on the flanks; whiskers black; under surface greyish-buff; hind feet silvery-grey; fore feet greyish-brown; tail thinly clothed with extremely fine black hairs.

Total length from nose to base of tail . . .	$6\frac{3}{4}$	inches.
———— of the tail	5	„
———— of the fore-arm	$3\frac{1}{4}$	„
———— of the hind leg and toes . . .	$1\frac{1}{2}$	„

Hab. Open plains of Darling Downs.

Remark.—The name of *sordidus* has been assigned to this animal from the dark colouring of its upper surface.

The third species to which Mr. Gould called attention is a remarkable black Rat of nearly the same size as, and of a similarly delicate form to the, Black Rat of Europe (*Mus Rattus*), but from which it differs in having the tip of the nose, the front part of the lips, a longitudinal stripe on the breast, the hind and fore feet, white. For this he proposed the name of

MUS MANICATUS.

Head, ears, and all the upper surface black, gradually passing into the deep grey of the under surface; nose, fore part of the lips, stripe down the centre of the throat and chest, hind and fore feet, white; whiskers deep black; tail denuded of hairs.

Length from nose to base of tail . . .	7	inches.
———— of the tail	5	„
———— of the fore-arm	$1\frac{1}{2}$	„
———— of tarsi and toes	$1\frac{3}{8}$	„

Hab. Port Essington.

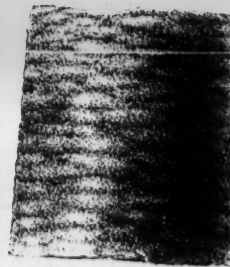
Remark.—This animal was presented to Mr. Gould by J. B. Turner, Esq.

The fourth is a very diminutive Rat, with coarse hair and a somewhat short tail; it is even smaller in size than the *Mus Gouldi* and *M. gracilicauda*, but is more nearly allied to the latter than to any other. Three or four specimens, all of the same size, are contained in the collection at the British Museum, and there are others in the Derby Museum at Liverpool, all of which were collected by Mr. Gilbert on the Victoria Plains, Western Australia.

MUS NANUS.

Head, all the upper surface, flanks, outer sides of the limbs, and

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1 & 3 *Furcella gigantea*
4 *Chama annulata*. 5. *C. tessellata*

hairs clothing the tail, brown, with numerous interspersed fine black hairs; under surface greyish-white, becoming much lighter and forming a conspicuous patch immediately beneath the tail; whiskers black; feet light brown; base of the whole of the fur bluish-grey.

Length from nose to base of tail	4 inches.
—— of the tail	$3\frac{1}{4}$ „
—— of the fore-arm	$\frac{1}{2}$ „
—— of the tarsus and toes	$\frac{3}{4}$ „

This animal is known to the Aborigines of Moore's River in Western Australia by the name of *Jilbeetch*.

On the part of Dr. Gray, Mr. Gould brought under the notice of the Meeting a new and very distinct species of *Hapalotis*, which is nearly allied to, but considerably exceeds in size, the *Hapalotis melanura*. This animal was collected by Mr. Elsey in the interior of Australia during the recent expedition from the north-west coast of Australia to Moreton Bay. It is a harsh wiry-furred animal, and differs from *H. melanura* not only in size, but in the apical half of the tail being white.

HAPALOTIS HEMILEUCURA.

Head, all the upper surface, and flanks very light sandy-brown, with numerous, but thinly placed, fine long black hairs; under surface buffy-white, with even lighter feet and fore-arms; tail brown, deepening into black about the middle, beyond which the apical portion is white; the white hairs being prolonged into a small tuft at the tip.

Length from nose to base of tail	8 inches.
—— of the tail	$6\frac{1}{2}$ „
—— of the fore-arm	$1\frac{1}{2}$ „
—— of the tarsus and toes	$1\frac{1}{2}$ „

2. OBSERVATIONS ON THE GENUS *FURCELLA*, OKEN, A CONCHIFER WITHOUT CONCHA OR NORMAL VALVES, AND ON THE GENERA *TEREDO* AND *CHENA*. BY JOHN EDWARD GRAY, PH.D., F.R.S., V.P.Z.S. ETC.

(Mollusca, Pl. XXXIX.)

The shelly tube of this animal has been described under several names. Linnæus considered it as a *Serpula*; Pallas, Home, and more recently Messrs. Adams have regarded it as a *Teredo*. Oken (1815) considered it a genus under the name of *Furcella*, to which the following names have been given:—*Septaria*, Lamk., *Clossonaria*, Férussac, *Clausaria*, Menke, *Kuphus*, Gray, altered to *Kyphus* by Agassiz.

There is no doubt that it is allied to *Teredo*, and it has been separated from that genus by the older conchologists because the apex

of the tube is solid and furnished with two separate tubular apertures, evidently for the siphons of the animal, which in some specimens are said to be produced beyond the end of the larger tube into two slender, elongated, cylindrical tubules, as figured by Rumphius; hence the name given to it by Oken: but I have never seen a specimen which exhibited this character.

The habit of the animal at once separates it from *Teredo*, which always lives in wood, while the *Furcella* lives sunk perpendicularly in the sandy mud of the tropical seas.

The external appearance of the shelly tube agrees with this habitat; for instead of being nearly cylindrical and more or less twisted according to the hardness or knots in the wood, it is club-shaped and closed at the larger end with a convex plate like the tube of *Chæna mumia*, which lives in the sand in a similar manner; but the tube of the *Furcella* is much larger, and generally rather distorted and irregular on the surface, divided into sections by more or less distinct constriction of its diameter or by the slight alteration in the direction of the tube, marked *a, b, c*, on the Plate, which on examination are evidently produced by the periodical stoppages in the growth of the animal, which at each period of suspended activity evidently closes up the end of the tube; the animal absorbs this terminal plate when it again returns to activity, and requires a larger tube for its increasing dimensions. In the specimen before me, the space between these interruptions in growth increased in length as the animal grew and enlarged in diameter.

The tube is thickened above as the animal leaves it, and is much thinner near the lower or closed extremity. The whole length of the tube is solid, without any perforations, except quite near the closed end, where it is pierced with a number of unequal-sized rather irregularly disposed small perforations, generally scattered; but sometimes there is a short series of five or six placed in a longitudinal line, and these holes appear to be filled up by an internal coat when the animal absorbs the end and lengthens its tube.

The larger end of the tube is entirely closed over by two convex, arched, shelly laminae, continuous from each side of the tube, and meeting and slightly overlapping one another in the central line, which is opposite to the septum between the two tubes in the smaller end of the shell-sheath of the animal.

These small holes are evidently intended for admission of water to the animal, and the shelly septa at the bottom to protect the animal from the sand in which it lives. The holes are similar to the tubes of *Penicillus aquarius* and *Clavagella*, which live in sand, and *Bryopa melitensis*, which lives in porous stone.

I have not observed any similar perforations in the tube of the *Teredo*; and indeed they would not be of any use, as the tube is deeply sunk in the substance of the wood in which they burrow.

The *Teredines* appear during their period of rest to close the end of their tube, with a shelly septum formed of a single convex plate. There are two fragments of tubes in the British Museum which appear to belong to that genus, from their external appearance and

prismatic structure, which are so closed at the bases : in one specimen the closing septum is uniformly convex, and like the tube-structure ; in the other the septum is divided into two equal portions by a transverse groove or depression ; but on neither of the specimens can I observe any traces of the septum being formed of two plates overlapping in the middle like the septum of *Furcella*.

The calcareous tubes of *Septaria*, mentioned by Home, Phil. Trans. 1806, p. 276, Dillwyn, R. Shells, ii. p. 1088, and in the 'Mag. Nat. Hist.' 1838, p. 408, as having a succession of *Septa*, proved on re-examination, Mr. Woodward informs me, to be the shell of *Vermeti*.

The character of the Family *Teredinidæ* is, that the animal always lives in a tube ; that it is provided with two appendages, one on each side of the siphons called *palettes*, which differ considerably in structure in the different genera ; and that the front of the body of the animal over the mouth is encased in two very small valves like those of a *Pholas* in structure and form, but in a more rudimentary state of development ; the tubular case of the animal, apparently taking the place or being in fact a great development of the dorsal additional shelly plate usually found more or less developed in the different genera of *Pholadidæ*.

Now it is clear that by Pallas, Home, and Messrs Adams referring this shelly tube to the genus *Teredo*, they believed that it had all these peculiarities.

I was, therefore, very much pleased when a perfect specimen of this interesting genus came into my hands yesterday, to believe that I might have the opportunity of bringing before the Society the palette and valves of this genus, which until now have been desiderata, especially as the sound made by shaking the tube showed that some shelly pieces were contained within it.

But on making a small aperture on the side near the base of the tube to examine the structure of the valves, I was astonished to find that, though the genus had two of the characteristics of the family of *Teredinidæ*, it wanted one of them ; the plates within were only the *palettes*, which are simple and somewhat like those of the more common *Teredo norvegica*, and that there were no proper shelly valves, not even any rudiments of them ; and that the animal forms a genus in that family which has the abnormality of wanting the true shelly valves which are so universal in the *Conchifera*.

The reason of this absence may be explained by the fact that the animal does not require them to protect its head and nervous centre, living as it does in a soft sandy mud ; while they are required in *Teredo* and the allied genera which have to bore their way into hard wood or stone to form the hole that is to be lined with the shelly tube.

Sir Everard Home in his 'Lectures,' when describing the animal of *Teredo navalis* (ii. t. 81), refers this shell-tube to the genus *Teredo*, and gives a very good figure of the *palettes*, or as he called them, "operculum," of it (tab. 81. f. 4 & 5), but he was not aware of this absence of the shelly valve ; for he figures what he considers the "boring shell of the same *Teredo*" (fig. 6) : but what he has

here taken for the "boring shell," or true valves of the animal, is evidently a fragment of the plates which closes the end of the tube.

It may be supposed that, perhaps, the valves might be very small and had fallen out; but I think it is impossible, as the holes at the narrow part of the tube are very small and scattered with fragments of shell and sand. The tube otherwise is quite closed, and the animal had evidently been eaten out by dipterous larva, as there were abundance of the cases of their pupa-skins in the cavity.

I may observe, that in the genus *Penicillus*, Brug. (*Aspergillum*, Lamk.), which also lives in sand, and has a fringe of tubes round the convex base of the tube, the shelly valves are immersed in the substance of the tube; but *Furcella* is the only genus of bivalve shells I am acquainted with that is entirely destitute of true valves, like the *Tunicata*.

The possession of the two separate apertures at the upper extremity of the tube does not appear to be exclusively confined to this genus; for in the British Museum we have three specimens of tubes which belong to *Teredo norvegicus*, or to a species allied to it, procured at the same time probably from the same place, but without any habitat.

They all have a succession of transverse laminae at the upper extremity of the tube. In No. 1 these plates are pierced with an oblong central hole for the passage of the siphons, as is the case with most specimens of *T. norvegicus*. No. 2 is similar, but there is a projection on one side of the perforation of the plates dividing the aperture on that side into two parts; and in No. 3, instead of having a single oblong aperture as in the other specimens, there are two sub-circular ones separated by a central transverse septum as in *Furcella*, as if the imperfect rib in No. 2 was transformed into a shelly plate extending right across the aperture, and which must be deposited between the two siphons of the animal.

In general the tubes of *Teredo* are entirely imbedded in the wood, but sometimes, as in a specimen we have in the Museum from the mouth of the River Nunn, the apices of the tubes of the shell project as if they were produced by the animal as the shelly tube enlarged beneath; but I believe this arises from, and at least is probably, if not entirely, produced from the surface of the wood disintegrating and leaving the apices of the tubes exposed. In the same collection are a series of the tubes of a species of *Teredo*, from Van Diemen's Land, which are more or less covered with *Serpula* and *Vermeti*; I suspect these must be specimens which have been partially or entirely exposed by the rotting of the wood in which they were enclosed.

These specimens from Van Diemen's Land, so covered with *Serpula*, also exhibit another peculiarity: in one case two tubes are parallel to each other, and firmly united by the outer surface of one of their sides into one body, which induced me to believe that they might be *Serpulae*, until I examined the structure of the shell and observed the simple contracted apex of the upper extremity.

In those genera of *Teredinidae* which have a number of half-septa

across the upper or smaller aperture of the tube, forming a kind of incompletely valvular structure on the sides of the siphons, or as in *Furcella*, where the space between the siphons is entirely closed up, leaving only a tube for the passage of the siphon on each side of the upper cavity, these septa and the solid calcareous matter forming the tubes must be deposited by the surface of the siphons themselves, as the canal of the univalve *Zoophagous Gasterops* is deposited by the siphon of the mantle of these animals.

And as the *palettes* or *opercula*, as they have been erroneously called, of this family, are fixed on each side between the base of the two more or less elongated siphons, in all those genera, which have a siphonal septum like *Furcella* or lamina like *Teredo* at the apical end of the tube, these *palettes* are always enclosed in the tube, and cannot be exerted as they are sometimes represented.

The character of this genus must be thus amended:—

FURCELLA.

Animal without any true shelly valves; siphonal palettes distinct, large; apex dilated, transverse, spatulate, with a central midrib and an elongated slender cylindrical base.

Tube clavate, irregular, sometimes bent; apex with two tubular siphonal apertures separated by a broad hard shelly longitudinal dissepiment; base pierced with small scattered perforations; end inclosed by two overlapping convex septa, arising from the sides and completely closing the ends.

These arched terminal plates appear to be absorbed before each period of activity, and the end is again closed with similar plates at each period of rest, after a sufficient elongation and enlargement of the tube for the protection of the enlarged animal. Living sunk in sandy mud on the shore in tropical climates.

The perfect specimens of *Chæna mumia* are covered with a thin external coat (sometimes covered externally with particles of sand and Foraminifera, which are imbedded in its surface), which is only partially attached to the general substance of the tube by thin lines, concentric with the lines of growth, leaving the rest of the coat separated from the surface of the tube by a distinct hollow space.

In some specimens, as those in the British Museum from Mozambique, the attached part of the outer coat is in nearly concentric ring-like transverse lines round the tube, leaving a more or less complete hollow ring between each attached portion. In others, as that from the Philippines in the same collection, the attached portion of the outer coat is oblique and interlaced so as to leave only narrow, elongated, oblong, hollow tessellated interspaces on the surface, which are acute at each end.

I am not certain that these characters are permanent; but if so, one may be called *Chæna annulosa*, and the other *Chæna tessellata*. In the latter the outer coat is simple and smooth externally. In the specimen from the Philippines the tube is covered with a close coat of sand and a few Foraminifera, which are deeply imbedded in

the substance of the thin outer coat, giving it a very peculiar appearance.

The shell on the newly hatched animal, which remains as a nucleus on the coat of the older shells, is smooth, uniformly convex, without any appearance of the anterior truncation or of the radiating ridges, which is so peculiar in the adult shells; and it seems also to have a straight lower edge without any appearance of the large ventral gape of the genus.

The cavity of the tube is contracted by an internal ring just above the hinder end of the shells, leaving an oblong central aperture of about half the diameter of the tube. This contraction is formed of several shelly plates with interspaces between them.

The animal has the power of repairing a fracture of the tube. There is a specimen in the Museum which had evidently been completely broken across about half its length, and the direction of the tube altered; the two portions have been united by an internal irregular white shelly coat.

EXPLANATION OF PLATE XXXIX.

- Fig. 1. *Furcella gigantea*, half the natural length; *a, b, c, d, e*, the remains of former closing of the tube.
 Fig. 2. *Furcella gigantea*, view of the terminal closing of the tube; of the natural size.
 Fig. 3. Palettes, showing the inner and outer sides.
 Fig. 4. *Chæna annulata*, enlarged.
 Fig. 5. *Chæna tessellata*, enlarged.

3. REVIEW OF THE SPECIES OF THE FISSIROSTRAL FAMILY MOMOTIDÆ. BY PHILIP LUTLEY SCLATER, M.A., F.Z.S. ETC.

(Aves, Pl. CXXVIII.)

Considerable additions have been made of late years to this rather peculiar family of birds, of which one member only was known to Linnæus; and there are now at least sixteen or seventeen different Motmots, of which examples occur in European collections. Two or three very interesting articles have been written upon the habits and certain structural peculiarities of these birds; but no modern writer except Lesson, in his little-known volume, entitled 'Description des Mammifères et Oiseaux' (where descriptions of eleven species known to the author are given), has attempted a complete review of the species. The following paper has been drawn up with a view to meet this deficiency, and to bring together in one place short characters sufficient for distinguishing these birds, so as to obviate the necessity of referring to all the different publications where the species were originally described.

Latham's term *Momotus*, being long precedent to Illiger's *Priornites*, which is sometimes employed for this group, has every claim for adoption. I therefore propose to call the group *Momotidæ* (as



$\frac{2}{3}$ nat. size.

PRIONIRHYNCHUS CARINATUS. (Du Bus.)

J. Jennens, lith.

W. West, imp.

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I think they have quite sufficient distinctive characters to entitle them to rank as an independent family), and not *Prionitidae*, as is done by some modern systematists.

The Motmots are a purely tropical American family, occupying an area nearly coequal with that of several other characteristic groups belonging to the same fauna. From Southern Mexico, where two species occur, they extend through Central America and some of the more southern Antilles over the whole of the eastern portion of South America as far southwards as south-eastern Brazil and Paraguay, where a single species is found. Their true focus seems to be Central America, where the greatest number of species and the most characteristic forms occur.

Concerning the spatulation of the two medial rectrices in some of these birds, which has occasioned so much discussion, I am not inclined to agree with Waterton, who thinks that it is performed by the bird with his own beak (see *Wanderings*, ed. 4, p. 114); nor with Schomburgk, who attributes it to the form of the nest (*Naumannia*, 1, pt. iv. p. 20); but I consider it a purely natural formation, which, like the denudation of the base of the bill in *Corvus frugilegus*, does not become complete except in the adult bird.

A similar formation occurs in certain groups of Humming-birds (*Spathura*, *Loddigesia*, &c.) and among the Parrots in the genus *Prioniturus*; but in these cases the feathers are, I believe, produced with the stem already denuded, and do not (as in *Momotus*) become spatulated by the falling away of the intermediate barb.

Familia MOMOTIDÆ.

Rostrum longius quam caput, modice incurvum, plerumque compressum, apice paululum uncinata; mandibularum marginibus serratis; oris angulis vibrissis munitis: nares basales, apertura parva et rotundata: alæ breves, rotundatæ, remigibus quarta, quinta et sexta fere æqualibus et longissimis: cauda, e rectricibus decem aut duodecim, quarum duæ externæ abnormaliter breves, elongata valde graduata, rectricibus duabus mediis longissimis et harum apicibus plerumque spatulatis: tarsi breves, antea scutellati: pedes prehensorii, digito exteriori longo et cum mediali usque ad medium, interiore autem brevi et ad basin tantum cum medio conjuncto; posteriore hoc paulo brevior; unguibus incurvatis et compressis.

Genus I. MOMOTUS.

Momotus, Lath. Ind. Orn. i. p. 110 (1790).

Prionites, Ill. Prodr. Syst. p. 224 (1811).

Baryphonus, Vieill. Analyse, p. 48 (1816).

Rostrum elongatum, compressum; mandibulis fortiter serratis: cauda elongata.

Div. a. *Caudæ rectricibus duodecim, harum duabus mediis spatulatis.*

1. MOMOTUS BRASILIENSIS.

Momotus, Briss. Orn. iv. p. 465.

Ramphastos momota, Linn. S. N. i. p. 152.

Momotus brasiliensis, Lath. Ind. Orn. p. 140; Gray, Gen. p. 68. sp. 1; List of Sp. in B.M. ii. 1. p. 39; Less. Descr. d. Mamm. et Ois. p. 264.

Prionites momota, Schomb. Guian. iii. 704; Bp. Consp. p. 165; Vol. Anisodaet. p. 8; Hahn, Ausl. Vög. ii. pl. 3.

Momotus momota, Jard. & Selby, Ill. Orn. 1. p. to pl. 23.

Baryphonus cyanocephalus, Vieill. N. D. d. H. N. xxi. 315.

Prionites brasiliensis, Tsch. F. P. p. 251 (?).

Motmot du Brésil, Buff. Pl. Enl. 370.

Le Motmot, Le Vaill. Ois. de Par. i. pl. 37, 38.

Clare viridis subtus rufescente indutus: pileo medio et lateribus capitis cum macula pectorali nigris; pileo antice thalassino, postice cæruleo cincto: cervice postica læte castanea.

Long. tota 17, alæ 5·75, caudæ 11·0; rostri a fronte 1·4, a rictu 1·95.

Hab. Cayenne, British Guiana (*Schomb. & Waterton*); Para (*Wallace*); Eastern Peru (*Tsch.*); R. Ucayali (*Hauxwell*).

Mus. Brit., Paris., &c.

The specific term *brasiliensis* is rather an unfortunate one for this bird, which seems most frequent in collections from Cayenne and Guiana, though since, as Mr. Wallace has informed me, it is common at Para and all along the Lower Amazon, the name cannot be said to be altogether inaccurate. But in what is generally known to ornithologists as Brazil—about Bahia and Rio—the present bird does not occur, and is replaced by another member of the family.

This species seems to extend up the valley of the Amazon as far as the confines of Eastern Peru. Specimens from the Ucayali in Mr. Gould's collection are rather more brightly coloured, but present the same characteristic castaneous blotch on the nape as the Cayenne bird, and are not separable from this species.

2. MOMOTUS ÆQUATORIALIS.

Momotus æquatorialis, Gould, P. Z. S. *antea*, p. 223.

Clare viridis, cervice postica et corpore subtus vix rufescente tinctis: pileo medio et lateribus capitis cum macula lata pectorali nigris: pileo undique cyaneo (his plumis cyaneis postice cæruleo præpilatis) et item nigro circumcincto.

Long. tota 17·0, alæ 6·3, caudæ 8·0; rostri a fronte 1·7, a rictu 2·15.

Hab. Archidona in rep. Equatoriana.

Mus. Joh. Gould.

Mr. Gould has obligingly lent me the type of his description of this Motmot, which, as might be expected from the locality, appears to be different from any other described species. It approaches most nearly to *M. Lessoni*, which it resembles in the blue border of the

back of the crown being again edged with black. But it is still larger than that species, the bill being stronger, and the wings longer, the hue of the blue on the head is less thalassine, the green of the body below is purer, and the black blotch on the breast is particularly large. The single specimen sent is in not quite perfect plumage, that is to say, the tail is not yet spatulated; but there are indications of the commencement of this process. The exact locality in which the specimen was obtained is marked 'Archidona,' which is a small Indian village on the Rio Misagualli, above its confluence with the Napo in the Canton of Quixos.

3. *MOMOTUS MICROSTEPHANUS*, sp. nov.

Momotus brasiliensis, Sclater, P. Z. S. 1855, p. 135.

Clare viridis, collo postico et corpore subtus rufescente tinctis; spatio verticali medio et lateribus capitis cum macula pectorali nigris: pileo antice thalassino, postice cæruleo late cincto.

Long. tota 14·5, alæ 4·6, caudæ 9·0, rostri a fronte 1·2, a rictu 1·8.

Hab. Interior of New Grenada.

Mus. P. L. S.

In my list of Bogota birds I noticed the peculiarities of the *M. brasiliensis* coming from that locality. Since then I have seen a considerable number of Motmots from that country, and, as they all present similar appearances, I think myself justified in elevating them to specific rank. The dimensions are smaller than in the *brasiliensis*, the black space on the head much more confined, the thalassine front being much broader and extending nearly to the vertex, leaving only a small black patch between it and the bright blue behind. And the castaneous patch behind the head is wanting, there being, however, in some specimens a brownish-bronze tinge on the upper back.

As a general rule the species from the mountain ranges of New Grenada are distinct from those of the eastern littoral of South America, and I think it seems likely that this Motmot does not form an exception to this rule.

4. *MOMOTUS NATTERERI*, sp. nov.

Prionites brasiliensis, Lafr. et d'Orb. Syn. Av. in Mag. de Zool. 1838, p. 34?

Supra pure viridis, subtus fulvo tinctus, ventre medio et tectricibus subalaribus pure pallide rufescenti-ochraceis: pileo medio et lateribus capitis nigris: pileo antice thalassino, postice cæruleo circumcincto, his pennis cæruleis thalassino mixtis, striga pectorali parva, fere omnino cyanea, medialiter nigra.

Long. tota 17·0, alæ 5·5, caudæ 9·0, rostri a fronte 1·4, a rictu 1·9, tarsi 1·1.

Hab. Yungas in Bolivia (d'Orb.); Goyaz, Brazil (Natterer).

Mus. Paris., Ac. Phil., Vindobien. et P. L. S.

I have one Bolivian specimen, of what would at first appear to be

M. brasiliensis, and have seen others. They closely resemble the Cayenne bird certainly, but seem to merit separation as much as its four or five other allies, which are now generally admitted as species. My Bolivian bird is nearly equal in size to the *brasiliensis*; but the bill is not quite so thick, and narrower and more compressed, and the wings are rather shorter. The plumage above is pure green up to the nape, presenting no tinge of rufous, but a slight bronzy gloss on the neck; below there is a strong rufous cast, the belly and under wing-coverts being nearly pure pale buff. The head is coloured nearly as *brasiliensis*, but the blue feathers behind are mixed with a little thalassine.

A Motmot in the Vienna Museum, which I refer to this same species, was obtained by Natterer in the neighbourhood of Goyaz in Brazil, and I therefore propose to distinguish this bird by the title of *M. Nattereri*. There are also examples of this species in the collections of the Academy of Natural Sciences of Philadelphia and of Mr. Gould.

5. MOMOTUS SUBRUFESCENS.

Momotus subrufescens, Schater, Rev. et Mag. de Zool. 1853, p. 489.

Supra viridis rufescente tinctus, subtus cinnamomeo-rufescens: pileo medio cum capitis lateribus et macula pectorali nigris; pileo undique thalassino cincto, sed his pennis thalassinis postice cæruleo terminatis.

Long. tota 16·0, alæ 4·8, caudæ 9·5, rostri a fronte 1·2, a rictu 1·7.

Hab. Santa Martha (*Verreaux*); Cartagena (*Mus. Berol.*).

Mus. Brit., Ac. Phil. et P. L. S.

I first described this apparently distinct species of Motmot from some specimens in MM. Verreaux's collection. It approaches nearest to *M. bahamensis*, but is not nearly so dark below as that bird; and has the upper back strongly tinged with rufous, which passes off as we descend towards the rump, whereas the upper surface of the other is nearly pure green. There are specimens of a Motmot which I refer to this species in the Berlin and British Museums, and the collections of Sir William Jardine and Mr. Gould.

6. MOMOTUS BAHAMENSIS.

Prionites bahamensis, Sw. An. in Men. p. 332; Bp. Consp. p. 68; Jard. & Selby, Ill. Orn. n. s. pl. 45; Bp. Consp. Vol. Anisodact. p. 8.

Momotus bahamensis, Gray, Gen. p. 68; List of Sp. ii. 1. p. 39.

Clare viridis, subtus suturate rufo-castaneus: pileo lateribus capitis et macula pectorali nigris; pileo undique thalassino cincto; occipitis penarum apicibus cæruleis.

Long. tota 16·0, alæ 5·5, caudæ 9·0, rostri a fronte 1·4, a rictu 1·85.

Hab. Bahamas (*Sw.*)?; Tobago (*Kirk.*); Trinidad.

Mus. P. L. S.

I am much inclined to doubt whether this Motmot is really found in the Bahamas. It is common in Tobago and Trinidad. It is easily distinguishable from its affines by the deep uniform chestnut colouring of the lower surface.

7. MOMOTUS LESSONI.

Momotus Lessoni, Less. R. Z. 1842, p. 174 ; Des Murs, Icon. Orn. pl. 62 ; Less. Descr. d. Mamm. et Ois. p. 266 ; Selater, P. Z. S. 1856, p. 285.

Prionites Lessoni, Bp. Consp. p. 165.

Clare viridis, gula cyanescente, pectore paululum rufescente ; pileo, lateribus capitis et macula pectorali nigris ; pileo undique cyaneo, his plumis cyaneis apud nucham cæruleo præpilatis, et postice item nigro marginato.

Long. tota 16·0, alæ 5·5, caudæ 8·5, rostri a fronte 1·45, a rictu 2·0.

Hab. Nicaragua, Realejo (*Less.*) ; South Mexico, Xacatepec (*Deppe in Mus. Berol.*) ; vicinity of Cordova (*Sallé*).

Mus. Paris., P. L. S.

This fine large green northern representative of *M. brasiliensis* may be recognized from its congeners by having the blue hind-border to the cap edged with black towards the nape. This is also the case in *M. æquatorialis*, but I have already mentioned its differences from that species.

8. MOMOTUS CÆRULEICEPS.

Momotus cæruleiceps, Gould, P. Z. S. 1836, p. 18 ; Gray, Gen. p. 68 ; Less. Descr. d. Mamm. et Ois. p. 265.

Prionites cæruleiceps, Bp. Consp. p. 165, et Consp. Vol. Anisodact. p. 8.

Prionites cæruleocephalus, Jard. & Selby, Ill. Orn. n. s. pl. 42.

Momotus subhutu, Less. Descr. Mamm. et Ois. p. 265.

Luride viridis : capitis lateribus et striga parva pectorali nigris ; pileo viridescenti-cæruleo ; fronte et superciliis clarioribus ; occipitis pennis nigro mixtis.

Long. tota 16·0, alæ 5·5, caudæ 8·5, rostri a fronte 1·15, a rictu 1·8.

Hab. Southern Mexico, Xalapa (*Mus. Berol. et Heineano*) ; Tamaulipas (*Mus. Jard.*) ; Vera Cruz (*Sallé*).

Lesson's *M. subhutu*, described in the little summary of this group given in his 'Description des Mammifères et Oiseaux,' is attached by Prince Bonaparte to his *M. psalurus* with a mark of doubt. But on attentively considering Lesson's description, I think there can be little doubt this is the bird really intended by it.

9. MOMOTUS MEXICANUS.

Momotus mexicanus, Sw. Phil. Mag. 1827, p. 442 ; Zool. Ill. n. s.

pl. 81; Gray, Gen. p. 68; List of Sp. in B.M. ii. pt. 1, p. 40; Less. Descr. &c. p. 266; Bp. Consp. Vol. Anisod. p. 7.

Prionites mexicanus, Bp. Consp. p. 165.

Momotus Martii, Jard. & Selby, Ill. Orn. pl. 23 (err.).

Viridis, supra rufescentior, subtus valde albescentior: pileo et cervice supra brunneo-rufis: striga pone oculos et macula pectorali nigris: macula suboculari cyanea.

Long. tota 12.5, alæ 4.4, caudæ 6.5, rostri a fronte 1.15, a rictu 1.5.

Hab. Southern Mexico, Golan (*Delattre*); Quicaltan (*Deppe in Mus. Berol.*); Lucappa (*Bates in Mus. Derb.*).

10. MOMOTUS CASTANEICEPS.

Prionites castaneiceps, Gould, P. Z. S. 1854, p. 154.

Similis M. mexicano sed major, pileo saturatiore castaneo et macula suboculari subobsoleta alba nec cyanea.

Hab. Guatemala, Coban (*Delattre*).

Mus. Derbiano, Ac. Phil. et Bremensi.

Besides the specimens noticed by Mr. Gould, I have seen examples of this species in the Bremen Museum also from Guatemala, and in the collection of the Academy of Natural Sciences of Philadelphia. It appears to be probably different from the preceding.

11. MOMOTUS SEMIRUFUS.

Prionites Martii, Spix, Av. Bras. i. p. 64. pl. 60?; Tsch. F. P. p. 252 certè.

Momotus semirufus, Selater, Rev. Zool. 1853, p. 489.

Baryphonus semirufus, Bp. Consp. Vol. Anisodact. p. 8.

Viridis; capite colloque supero et corpore infra ad medium ventrem castaneo-rufis, lateribus capitis et macula pectorali nigris: ventre imo crissoque cum alis extus paululum cærulescentibus.

Long. tota 19.5, alæ 7.3, caudæ 11.5, rostri a fronte 1.75.

Hab. New Grenada, Santa Martha and Bogota: Rio Napo, Ecuador (*Jameson*); Upper Peruvian Amazon, Rio Javarri (*Cast. et Dev.*).

Mus. Brit., Paris.

This fine large Motmot I first saw in 1853 in the hands of MM. Verreaux, who had then lately received two specimens of it from their collector at S. Martha. Shortly afterwards in looking through the birds of this family in the collection of the Jardin des Plantes I observed three individuals of the same species, one of which was labelled 'Bogota,' and another as having been collected by MM. Castelnau and Deville on the Rio Javarri. I at that time considered the bird as without doubt unnamed, and described it accordingly in Guérin's 'Revue et Magazin de Zoologie.' But about a year afterwards, in looking through Tschudi's types at Neuchatel, I was surprised to find a specimen of this bird labeled '*P. Martii*, Spix,' as that name has been generally thought to apply to the *M. platyrhyn-*

chus of Leadbeater—belonging to the genus *Prionirhynchus*. Now upon referring again to Spix's figure and description, I think that he is as likely to have intended one bird as the other for his *P. Martii*, and it will be difficult to pronounce decisively which of the two ought to bear that name, until the type in the Munich Museum, if still existing, be examined, and the fact ascertained whether it is a specimen of *Momotus semirufus* or *Prionirhynchus platyrhynchus*.

Div. b. *Caudæ rectricibus decem, et harum mediis non spatulatis.*

12. MOMOTUS CYANOASTER.

El tutu, Azara, Pax. i. p. 243.

Baryphonus cyanogaster, Vieill. N. D. d'N. II. xxi. 317, et Enc. Méth. p. 898.

Prionites ruficapillus, Hartl. Ind. Azar. p. 4; Max. Beitr. iii. 1257; Licht. Verz. p. 21; Tsch. F. P. p. 251.

Baryphonus ruficapillus, Vieill. Gal. pl. 190; Bp. Consp. Vol. Anisodact. p. 8.

Prionites tutu, Ranz. Elem. di Zool. iii. pt. 3. p. 157.

Momotus levaillantii, Less. Man. d'Orn. ii. 104; Gray, Gen. p. 68; List of Sp. in B.M. ii. pt. 1. p. 39; Less. Descr. d. Mamm. et Ois. p. 265.

Prionites levaillanti, Bp. Consp. p. 163.

Le Motmot oranroux, Levaill. Prom. Supp. pl. B.

Viridis: capitis lateribus et macula duplici pectoris nigris: pileo toto et fascia lata ventrali castaneis: ventre imo cærulescente.

Long. tota 16·5, alæ 5·5, caudæ 9·0, rostri a fronte 1·4, a rectu 2·0.

Hab. Paraguay (*Azara*); South-eastern Brazil (*P. Max.*); Eastern Peru (*Tsch.*).

The Prince Maximilian found this Motmot singly or in pairs in the woods of the south-eastern provinces of Brazil. He says it was generally observed sitting quietly upon a branch like a *Bucco*, and allowing the hunter to approach without fear. Especially in the morning and evening it emits its prolonged, soft, flute-like note, resembling that of our European Hoopoe. Its food consists of insects.

This bird, which is well figured by Le Vaillant in the Supplement to his 'Promerops, &c.' pl. B, is sometimes called *ruficapillus*; but that name is more strictly applicable to the species represented by the same author in his 'Oiseaux de Paradis,' pl. 39, and of which some account will be found hereafter.

Although I have never yet had an opportunity of examining Paraguay specimens of this species, there seems little doubt that Azara's "*Tutu*" is referable to it, and we must therefore employ Vieillot's term "*cyanogaster*" as its first-given specific appellation, although in most examples the blue tinge on the belly is but slightly apparent.

Genus II. HYLOMANES.

Hylomanes, Licht. Abh. Ac. Berol. 1838, p. 449.

Rostrum debilius et minus incurvum, non compressum sed dilatatum, marginibus tenuissime serratis: cauda brevis, rectricibus decem et harum mediis non spatulatis.

1. HYLOMANES MOMOTULA.

Hylomanes momotula, Licht. Abh. Ac. Berol. 1838, p. 449. pl. 4; Bp. Consp. p. 164.

Momotus momotula, Gray's Gen. p. 68. pl. 24; List of Sp. in B. M. ii. 1. p. 40.

Viridis: pileo rufo: superciliis cyaneis: regione auriculari nigra: subtus albescens, viridi tincta.

Long. tota 6·0, alæ 3·0, caudæ 2·25, rostri a fronte ·9.

Hab. Mexico, Valle Real (Licht.); Jalapa (Sallé).

Mus. Brit., Berolin., Bruxelliano.

2. HYLOMANES GULARIS.

Prionites gularis, Lafr. R. Z. 1840, p. 130; Bp. Consp. p. 165, et Consp. Vol. Zygodact. p. 8.

Momotus gularis, Gray's Gen. i. p. 68; Strickl. Cont. Orn. 1848, p. 33. pl. 17; Less. Descr. Mamm. et Ois. p. 266.

Viridis: gula et ventre imo cyaneis: regione ophthalmica rufescente: macula auriculari utrinque et pectoris duplici nigris: cauda subtus fusca, supra apice cærulescente.

Long. tota 10·0, alæ 4·0, caudæ 5·5, rostri a fronte 1·1.

Hab. Guatemala (Lafr. et Strickl.).

Mus. Paris.

This bird seems to me to be most naturally arranged as a second species of *Momotula*, though, as Mr. Strickland has observed, it partakes of the characters of the other genera. Mr. Strickland's examples were, I believe, from the neighbourhood of the city of Guatemala.

Genus III. PRIONIRHYNCHUS.

Crypticus, Sw. Class. B. ii. p. 338 (1837).

Rostrum elongatum, dilatatum, carinatum, incurvum, marginibus tenuissime serratis: caudæ rectricibus decem, harum mediis elongatis et spatulatis.

1. PRIONIRHYNCHUS PLATYRHYNCHUS, Leadbeater.

Momotus platyrhynchus, Leadb. Linn. Trans. xvi. p. 92; Jard. & Selby, Ill. Orn. pl. 106; Gray's Gen. p. 68. sp. 8.

Prionites Martii, Spix, Av. Bras. i. p. 64. pl. 60?

Crypticus Martii, Bp. P. Z. S. 1837, p. 119, certè; Consp. p. 165; Less. Descr. d. Mamm. et Ois. p. 267.

Viridis, capite et cervice supra et corpore infra ad medium pectus castaneis: cauda cærulescenti-viridi: striga lata per oculos ad aures et maculis duabus in pectore nigris.

Long. tota 14·0, alæ 4·9, caudæ 8·2.

Hab. Eastern Peru, wood region (*Tsch.*); Sarayaçu (*Cast. & Dev.*); Bolivia.

This bird was first well described by Mr. Leadbeater before the Linnean Society. I have already stated that I think it possible that Prince Bonaparte and subsequent naturalists have been in error in considering Spix's *Prionites Martii* as intended for this bird, and I have therefore thought it safer to employ for it Leadbeater's name *platyrhynchus*.

I have made the new generic term *Prionirhynchus* for this form in the place of *Crypticus*, because the latter term is in use for a genus of Coleopterous insects, founded by Latreille in 1817.

2. PRIONIRHYNCHUS CARINATUS. (Pl. CXXVIII.)

Prionites carinatus, Du Bus, Bull. Ac. Brux. xiv. pt. 2. p. 108, et R. Z. 1848, p. 249.

Crypticus carinatus, Bp. Consp. p. 165.

Supra olivascenti-viridis: fronte juxta marginem maxillæ rufescente: superciliis cyaneis: tænia a naribus infra oculos ad regionem paroticam ducta et pennulis quibusdam pectoris nigris: infra virescenti-rufus, mento viridi-cærulescente: remigibus fusco-nigris, pogonio externo viridi-cærulescente: cauda supra viridi-cærulescente: rectricibus duabus intermediis spatulatis et nigro terminatis: rostro et pedibus nigris, illius apice cornea.

Long. tota 14·0 poll.

Hab. Guatimala (*Du Bus*).

The Vicomte Du Bus has kindly sent me a beautiful figure of this Motmot, from which the accompanying plate has been reduced. I have never seen this bird, and I believe his specimen is the only one known.

Genus IV. EUMOMOTA, gen. nov.

Rostrum Prionirhynchi sed minus carinatum et dilatatum, paulum incurvum, mandibularum marginum media solum parte serrata: caudæ rectricibus decem, harum quinque utrinque extimæ graduatæ, ad apicem quadriformes; mediæ duæ ceteris duplo longiores, magna parte denudatæ et spatulis terminatæ.

1. EUMOMOTA SUPERCILIARIS.

Crypticus superciliaris, Sandbach, MS

Prionites (Crypticus) superciliaris, Jard. & Selby, Ill. Orn. n. s. pl. 18.

Momotus superciliaris, Gray, Gen. p. 68. sp. 10; List of Sp. in B. M. ii. 1. p. 40.

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Crypticus superciliosus, Sw. An. in Men. p. 267; Less. Desc. d. Mamm. et Ois. p. 267.

Crypticus apiaster, Less. R. Z. 1842, p. 174.

Momotus yucatanensis, Cabot, Pr. N. H. Soc. Boston, iv. 467; Gray, Gen. p. 68. sp. 13.

Prionites yucatanensis, Bp. Consp. p. 165.

Olivaceus; dorso medio, macula post-oculari et ventre imo castaneis: superciliis latis et maculis subocularibus læte glaucocyaneis: vitta per oculos utrinque transeunte nigra: vittulari longitudinali nigra, utrinque cyaneo marginata: alis nigris extus cyaneo marginatis: rectricibus subtus nigricantibus, supra cærulescentibus, nigro terminatis: duarum mediarum rachide nuda longissima, apice spatulata.

Long. tota 14·0, alæ 4·5, caudæ 8·0.

Hab. Central America, Yucatan (Cabot); Bay of Campeachy (M. B.); Guatemala and Honduras.

This beautiful bird, with the peculiar incurved bill—the serration of which is confined to the middle of the mandibles—and comparatively short tail, with the two medial rectrices far projecting and denuded to a much greater extent than in other Motmots, seems to present characters quite as distinctive as *Hylomanes* or *Prionirhynchus*, and I have accordingly proposed for it the new generic name *Eumomota*. Prince Bonaparte has remarked (Notes Orn. p. 89) that there seems to be two varieties of this bird, one from the western coast of Central America more red, the other from the eastern coast more blue.

The preceding account embraces all the species of Motmots with which I am acquainted. There are a few others mentioned by authors, concerning which I subjoin the following remarks:—

1. *Le motmot dombé*, Levaill. Ois. de Par. i. p. 113. pl. 39.

Baryphonus ruficapillus, Vieill. Nouv. Dict. d'H. N. xxi. p. 315.

Prionites dombeyanus, Ranz. Elem. di Zool. iii. pt. 3. p. 158.

Momotus dombeyi, Less. Tr. d'Orn. p. 251; Less. Man. d'Orn. p. 103.

Momotus rubricapillus, Steph. Zool. xiv. p. 84.

Prionites dombeyi, Sw. Class. ii. p. 338.

Momotus ruficapillus, Gray's Gen. p. 68. sp. 4.

Prionites ruficapillus, Bp.'s Consp. p. 165. sp. 4.

Momotus tutu, Less. Descr. d. Mamm. et Ois. p. 265.

Le Vaillant, upon the authority of whose figure some systematists have formed and others adopted the several scientific names above given, writes as follows concerning this Motmot:—"Whatever may be the case with the second species of Motmot of the older writers, which all nomenclatists have spoken of, but none have seen, here is one well-characterized, and differing from the first in that it has all the top of the head red, and that it has not part of the tail-feathers ebarbed, nor a black spot on the stomach. All is otherwise quite similar in colour between the two species, except that the green of

the back and wings and the blue of the middle tail-feathers and primaries are more pure in this species than in the other. The size also of the two birds is nearly the same : in the tail there is this difference, that the four middle feathers of the present Motmot are of equal length. We owe this second species of Motmot to Dombé, a zealous naturalist. . . . The *Houtou* is found in Guiana; the *Motmot Dombé* inhabits the forests in the environs of Lima. The traveller I have named assures me that it is very common there, and that he had not remarked any difference between many individuals that he had seen of this species and the two he had brought back, of which one was deposited with many other beautiful birds of Peru in the cabinet of the king. It is a pity that this individual has been entirely destroyed by fumigations of sulphur and by insects; as to the other, we know not what has become of it."

Such is Le Vaillant's account. Supposing it to be accurate, the species appears distinct from any other known. But no such bird has been recognized by any other author, nor is to be found, as far as my experience goes, in any collection. As for its frequency in the vicinity of Lima, I am inclined to doubt the fact. Von Tschudi gives us accounts of three Motmots that inhabit the Cisandean wood-region of Peru, but says nothing of one occurring in the coast-region; nor do I believe that any species of the family occurs on the western side of the Andes. Had this bird been common about Lima he could hardly have missed it, collecting so much as he did in that quarter. I cannot help thinking therefore that Le Vaillant's figure and description are inaccurate, having been made after the "moths and fumigations" had operated upon the specimen, or perhaps from Dombé's recollections. In such case the *Motmot dombé* was probably the *Momotus cyanogaster*, which does occur in *Eastern Peru*, and has the medial rectrices whole.

2. "*Momotus psalurus*, Puch."; Bp. Compt. Rend. 1854. xxxviii. p. 659, et Notes Orn. s. l. coll. Delattre, p. 88.

Prince Bonaparte, in his communication to the French Academy on the collections made by M. Delattre in Nicaragua, has given a short account of this species, which I subjoin:—"Les exemplaires rapportés de Nicaragua par M. Delattre sont intermédiaires entre *momotus* et *bahamensis* pour les couleurs comme pour la localité (!). La calotte noire est en effet moins étendue que dans le *P. bahamensis*, mais plus que dans *P. momotus* et entourée par la teinte aigue-marine même postérieurement, le bleu n'occupant que la pointe des longues plumes: les couvertures inférieures des ailes sont rousses ainsi que la ventre et les cuisses: les appendicules des penes de la queue sont beaucoup plus larges que dans les autres espèces: le coup d'œil exercé de M. Pucheran a distingué à cause de cela dans nos galeries ce beau Volucre, notre seconde espèce, sous le nom de *Pr. psalurus*."

I can make no other suggestion concerning this species than that it is probably the same as *M. lessoni*. Dr. Pucheran utterly disclaims the paternity of the name which Prince Bonaparte has thus attempted to affiliate on him.

3. *Momotus parvirostris* is a name mentioned by Prince Bonaparte in the same passage. He merely says it is "*encore intermédiaire*," i. e. between *M. brasiliensis* and *psalurus* I suppose. The bird intended, I should judge from the locality, to be perhaps *M. subrufescens*.

4. *Momotus varius*, Briss. Orn. iv. p. 469; Gm. S. N. i. p. 357, is an old name founded on Ray's Yayauhquitoll (!), concerning which it is difficult to say much.

The annexed table will serve to give a general idea of the geographical distribution of this family as far as I have been able to gain information upon it.

MOMOTIDARUM SCHEMA GEOGRAPHICUM.

	Southern Mexico.	Central America.	Littoral of New Grenada.	Interior of New Grenada.	Interior of Ecuador.	Eastern Peru.	Bolivia.	Paraguay.	S.E. Brazil.	Lower Amazon.	Guiana and Cayenne.	Trinidad.
I. MOMOTUS.												
1. <i>brasiliensis</i> .....	...	...	...	...	...	*	...	...	...	*	*	...
2. <i>æquatorialis</i> .....	...	...	...	...	*	...	...	...	...	...	...	...
3. <i>microstephanus</i> .....	...	...	...	*	...	...	...	...	...	...	...	...
4. <i>nattereri</i> .....	...	...	...	...	...	...	*	...	...	...	...	...
5. <i>subrufescens</i> .....	...	...	*	...	...	...	...	...	...	...	...	...
6. <i>bahamensis</i> .....	...	...	...	...	...	...	...	...	...	...	...	*
7. <i>lessoni</i> .....	*	*	...	...	...	...	...	...	...	...	...	...
8. <i>cæruleiceps</i> .....	*	...	...	...	...	...	...	...	...	...	...	...
9. <i>mexicanus</i> .....	*	...	...	...	...	...	...	...	...	...	...	...
10. <i>castaneiceps</i> .....	...	*	...	...	...	...	...	...	...	...	...	...
11. <i>semirufus</i> .....	...	...	...	*	*	*	...	...	...	...	...	...
12. <i>cyanogaster</i> .....	...	...	...	...	...	*	*	*	*	...	...	...
II. HYLOMANES.												
1. <i>momotula</i> .....	*	...	...	...	...	...	...	...	...	...	...	...
2. <i>gularis</i> .....	...	*	...	...	...	...	...	...	...	...	...	...
III. PRIONIRHYNCHUS.												
1. <i>platyrhynchus</i> .....	...	...	...	...	...	*	*	...	...	...	...	...
2. <i>carinatus</i> .....	...	*	...	...	...	...	...	...	...	...	...	...
IV. EUMOMOTA.												
1. <i>superciliaris</i> .....	...	*	...	...	...	...	...	...	...	...	...	...
	4	5	1	2	2	4	3	1	1	1	1	1

4. ON A COLLECTION OF BIRDS TRANSMITTED BY MR. H. W. BATES FROM THE UPPER AMAZON. BY PHILIP LUTLEY SCLATER, M.A.

Mr. S. Stevens has lately received a small but interesting collection of birds from Mr. H. W. Bates, now resident at Ega on the Upper Amazon. Although many travellers and collectors have passed through this country, we are still without any detailed information concerning the general character of its ornithology. Those into whose hands collections from new localities come, are in general too prone to pick out single objects and describe them as new, instead of what is much more important in a scientific point of view, giving an accurately determined catalogue of the whole of the species. Such accounts are always useful—in the first place increasing our knowledge of the facts of geographical distribution, and, secondly, giving great assistance to future investigators who are studying collections from the same quarter. The species transmitted by Mr. Bates are the following. They are mostly from Ega or from the Rio Javarri, the frontier stream of Peru and Brazil, but the exact locality is in every case affixed.

Mr. J. H. Gurney has determined the Accipitres in this collection.

1. MORPHNUS URUBITINGA (Gm.).

Rio Javarri.

2. MORPHNUS SCHISTACEUS (Sund.).—*F. ardesiacus*, Licht. in Mus. Berol.

Rio Javarri.

3. BUTEO PENNSYLVANICUS (Wils.).

Rio Javarri.

4. ASTURINA MAGNIROSTRIS (Gm.).

Ega.

5. MICEASTUR GILVICOLLIS (Vieill.).—*Sparvius gilvicollis*, Vieill. Nouv. Dict. x. p. 323; Puch. R. Z. 1850, p. 91.—*M. concentricus*, auct.

Rio Javarri.

6. HARPAGUS DIODON (Temm.).

Rio Javarri.

7. SCOPS — ?

Ega.

8. TROGON MELANURUS, Sw.

Ega and Rio Javarri, ♂ et ♀.

9. BUCCO MACRODACTYLUS (Spix); Sclater, Syn. Bucc. p. 14.

Rio Javarri.

10. *BUCCO PULMENTUM*, Sclater, P.Z.S. 1855, p. 194, pl. 106.
Rio Javarri.

11. *BUCCO ORDI*, Cass.; Sclater, Syn. Bucc. p. 9; Pelzeln, Sitz.
Ac. Wiss. Wien, 1856, p. 492.
Ega.

12. *MONASA PERUANA*, Sclater, P.Z.S. 1855, p. 194.

13. *UROGALBA PARADISEA* (Linn.).
Ega.

M. Pelzeln has made some remarks in the 'Sitzungsberichte' of the Vienna Academy on my separation of *Urogalba amazonum* from *U. paradisea*. I confess I was probably wrong in regarding the latter as a species, and that it is apparently only a variety of *U. paradisea*.

14. *GALBULA CHALCOCEPHALA*, Dcv.; P.Z.S. 1855, p. 14.
Rio Javarri.

15. *GALBULA TOMBACEA*, Spix.
Rio Javarri.

Since I have seen additional specimens of this bird, I am rather uncertain as to the reality of the distinctness of *G. fuscicapilla* of New Grenada (P. Z. S. 1855, p. 13. Pl. LXXVII.). In one of the Amazon specimens there is nearly as much fuscous colouring on the head as in the New Grenadian bird; and this may possibly be referable to age or sex.

16. *BRACHYGALBA ALBIGULARIS*.—*Galbula albigularis*, Spix,
Av. Bras. i. pl. 57. f. 1. p. 54.
Rio Javarri.

Æneo-nigra, pileo fusco: superciliis et regione auriculari cum gula albis: plaga elongata in ventre medio castanea: rostro flavicanti-albo, pedibus nigris.

Long. tota 6·2, alæ 2·6, caudæ 2·0, rostri a rectu 1·9.

When I saw Spix's somewhat deteriorated type-specimen of the present species in the Museum at Munich, I somewhat hastily concluded that it was a young bird of *G. paradisea*. But the examination of the example in Bates's collection, and of another similar one in the British Museum, have convinced me that this is certainly not the case. It seems in truth a *Brachygalba*, with the same short square tail as in *B. inornata*, but with the bill rather stouter and straiter. Herr v. Pelzeln states in one of his interesting communications to the Vienna Academy, 'Ueber neue und wenig gekannte Arten der K. ornitholog. Sammlung,' that he thinks that this bird may be possibly the young of my *B. melanosterna*. I am sorry I have no means at present of comparing it with examples of that Jacamar; but the very pure white throat of the present species,

which is quite absent in *B. melanosterna*; seems to render this supposition improbable.

17. *JACAMEROPS GRANDIS* (Gm.).

Rio Javarri.

18. *LAMPORNIS MANGO* (Linn.).

Santarem.

19. *EUPETOMENA MACRURA* (Gm.); Gould, Mon. Troch. pt. 6. fig. 1.

20. *LAMPORNIS AURESCENS*, Gould, P. Z. S. 1856, p. 88.

Rio Javarri.

A young bird.

21. *CHRYSURONIA JOSEPHINÆ* (Bourc.).

Rio Javarri.

A young bird which Mr. Gould is inclined to refer to this species.

22. *CHLOROPHANES ATRICAPILLA* (Vieill.).

Ega.

23. *DACNIS FLAVIVENTRIS*, Lafr. & D'Orb.

Rio Javarri.

24. *DACNIS CAYANA* (Linn.); Contr. Orn. 1851, p. 106.

Ega.

A nearly allied species to this widely distributed bird is *Dacnis nigripes* from Brazil, lately described and figured by Herr A. von Pelzeln in the Proceedings of the Vienna Academy (1856, March, vol. xx. p. 157). It may be distinguished by its black feet, and the female is more like that of *D. angelica*. I have specimens of both sexes in my collection.

25. *DACNIS ANGELICA*, De Filippi; Contr. Orn. 1851, p. 107.

Ega.

Prince Bonaparte has named * the Bogota variety of this bird *archangelica*. But if the Bogota bird be considered distinct, it ought to bear the name "*angelica*," as originally given to it by De Filippi, while that from Cayenne is more particularly Mr. Strickland's *Dacnis melanotis*.

26. *CÆREBA CYANEA* (Linn.).

Ega.

27. *CÆREBA CÆRULEA* (Linn.).

Ega.

* Catalogue des oiseaux recueillis à Cayenne par M. E. Desplanches, p. 7.

28. *CEREBA NITIDA*, Hartl.

Rio Javarri.

29. *PITYLUS GROSSUS* (Linn.).

Rio Javarri.

30. *TACHYPHONUS SURINAMUS* (Linn.).

Ega.

31. *TACHYPHONUS CRISTATUS* (Gm.).

Ega.

32. *TACHYPHONUS RUFIVENTRIS* (Spix).

Rio Javarri.

33. *LANIO VERSICOLOR* (Lafr. & D'Orb.).

Rio Javarri.

This is the only example I have ever met with of this bird besides the types brought by D'Orbigny from Bolivia.

34. *CALLISTE SCHRANKI* (Spix).

Ega and Rio Javarri.

35. *CALLISTE BOLIVIANA*, Bp.

Rio Javarri.

36. *CALLISTE GYROLOIDES*, Lafr.

Rio Javarri.

37. *TANAGRELLA IRIDINA*.*Tanagra iridina*, Hartl. R. Z. 1841, p. 105.

Tanagrella elegantissima, Verr. R. Z. 1853, p. 195; Selater, P. Z. S. 1856, p. 267, et Syn. Av. Tan. p. 93.

Rio Javarri.

On the receipt of this specimen from the Rio Javarri, it immediately occurred to me that Dr. Hartlaub's *Tanagra iridina* from Mogobamba in Peru was much more likely to belong to this species (generally known as "*elegantissima*") than to the *T. velia* of Cayenne, with which it is usually associated. I therefore despatched specimens of both birds to Bremen, with a request to Dr. Hartlaub to compare his type with them. Dr. Hartlaub states in reply, that although in his specimen there is a distinct greenish hue on the sides of the head, he considers his *T. iridina* to be without doubt the same as *T. elegantissima*, and not as *T. velia*. It becomes necessary, therefore, to use the specific appellation *iridina*, as the earliest given for this Tanager.

38. *NEMOSIA FLAVICOLLIS*, Vieill. ?

Rio Javarri.

39. *LEISTES GUIANENSIS* (Gm.). — *Trupialis guianensis*, Bp.
Consp. p. 430.
Santarem.

40. *QUISCALUS LUGUBRIS*, Sw. ? Bp. Consp. p. 424.

41. *CACICUS YURACARIUS* (D'Orb. & Lafr.).
Rio Javarri.

I very much doubt whether Prince Bonaparte's *C. devillii* is anything more than the female of this bird.

42. *CYANOCORAX AZUREUS* (Temm.).
Rio Javarri.

43. *DENDROCOLAPTES CAYENNENSIS* (Gm.).
Ega.

44. *PICOLAPTES* — ?
Ega.

45. *HYPOCNEMIS NÆVIA* (Gm.) ; Pl. Enl. 823. f. 1.
Rio Javarri.

46. *TITYRA CAYANA* (Linn.) ; P. Z. S. 1857, p. 69.
Rio Javarri.

47. *CEPHALOPTERUS ORNATUS*, St. Hilaire.
Rio Javarri.

48. *GYMNODERUS FÆTIDUS* (Linn.).
Rio Javarri.

49. *QUERULA RUBRICOLLIS* (Gm.).
Rio Javarri and Tunantins.

50. *COTINGA MAYNANA* (Linn.) ; Bp. Consp. p. 176.

51. *PIPRA RUBRICAPILLA*, Temm. Pl. Col. 54. f. 3.
Ega.

52. *PIPRA LEUCOCILLA*, Linn.
Ega.

53. *PIPRA CORONATA*, Spix, Av. Bras. ii. pl. 7. f. 1.
Rio Javarri.

54. *PIPRA STRIOLATA*, Bp. ; Gray's Gen. pl. 67. f. 2.
Rio Javarri.

55. *CIRRHIPIPRA FILICAUDA* (Spix), Av. Bras. ii. pl. 8.
Rio Javarri.

56. *CHIROXYPHIA REGINA*, Sclater, Ann. N. H. June 1856, p. .
Rio Javarri.

I am quite pleased at meeting with another example of this pretty Manikin, which I described from Natterer's types in the Vienna Museum.

57. *IODOPLEURA ISABELLÆ* (Parz.); Icon. Orn. pl. 68.
Rio Javarri.

Prince Bonaparte gives Venezuela as the habitat of this species. Mr. Bates's specimens are from the Rio Javarri, and Mr. Wallace obtained specimens on the river Tocantins in September 1848. The *I. pipra* is from S. Eastern Brazil, while *I. laplaci*—a scarce species, only possessed, I believe, by the Paris Museum—is said to be from British Guiana.

58. *ARA ARACANGA* (Linn.).
Rio Javarri.

59. *ARA SEVERA* (Linn.).
Rio Javarri.

Mr. Bates has sent two examples of the species, one of which is very much varied with red below.

60. *CONURUS GUIANENSIS* (Linn.).

61. *CONURUS MELANURUS* (Spix).
Tunantins.

62. *PIONUS MENSTRUUS* (Linn.).
Rio Javarri.

63. *CAICA BARRABANDI* (Kuhl).
Rio Javarri.

64. *CAICA HISTRIO* (Bodd.), Pl. Enl. 744.
Rio Javarri.

65. *CAICA XANTHOMERIA*, G. R. Gray in Mus. Brit.

This apparently new species, of which the only two specimens sent have passed into the collection of the British Museum, closely resembles *C. leucogastra*, Kuhl (*badiceps*, Lear), but has the flanks and thighs yellow instead of green, and exhibits some minor variations in shades of colouring.

66. *PSITTACULA* — ?

A bird of this difficult little group, different from any I have before seen—perhaps referable to Souancé's *P. cyanopygia*.

67. *RAMPHASTOS CUVIERI*, Wagl.; Gould, Mon. Ramph. ed. 2.
pl. 8.
Ega.

68. *PTEROGLOSSUS HUMBERTI*, Wagl.; Gould, Mon. Ramph. ed. 2. pl. 22.

Rio Javarri.

A pair of this rare species have passed into the collection of the British Museum.

69. *PTEROGLOSSUS FLAVIROSTRIS*, Gould, Mon. Ramph. ed. 2. pl. 29.

Ega and Rio Javarri.

70. *SELENIDERA LANGSDORFI* (Wagl.); Gould, Mon. Ramph. ed. 2. pl. 33.

Ega.

71. *PTEROGLOSSUS BEAUHARNAISI*, Wagl.; Gould, Mon. Ramph. ed. 2. pl. 25.

Ega.

72. *CAPITO PERUVIANUS* (Cuv.).

Rio Javarri.

73. *EUBUCCO HARTLAUBI* (Lafr.), fem. aut juv.?

Rio Javarri.

I have hitherto regarded this bird as the young of *E. hartlaubi*, from which it differs in the want of the aurescent head and of the blue tinge on the throat, sides of the head and supercilia, and by its lemon-yellow and not orange neck-band. I am not sure that I am right. Examples in the same state of plumage in the Paris Museum are marked "*Capito glaucogularis*, Tschudi," which is certainly wrong.

74. *EUBUCCO AURANTICOLLIS*, sp. nov.

Viridis, pileo et mento summo intense sanguineo-rubris, torque cervicali postica clare flavicanti-viridi: cervice antica aurantia; pectore coccineo, ventre flavo et viridi strigato: rostro flavo, pedibus nigris.

Long. tota 5.5, alæ 2.6, caudæ 1.9.

This beautiful species of Barbet closely resembles *E. richardsoni* figured in Gray and Mitchell's Genera of Birds, but may be distinguished by its light green posterior neck-band, orange and not lemon-yellow throat, and deeper scarlet breast. Mr. Bates has transmitted five examples from the Rio Javarri, which are all alike. The *Eubucco richardsoni* is from New Grenada (Bogota collections).

The British Museum contains an example of this new species, collected by Hauxwell on the Ucayali in August 1852 and marked "Irides red."

I am now acquainted with seven species of the section *Eubucco*, namely, (1) *E. RICHARDSONI* (*sulphureus*, Eyton, Contr. Orn. 1849, p. 130) ex Nov. Grenada; (2) *E. AURANTICOLLIS*; (3) *E. BOURCIERI* (Lafr. Rev. Zool. 1845, p. 79, et 1849, p. 116, pl. 3) ex Nov.

Grenada et fl. Napo; (4) *E. PICTUS* (Pl. Enl. 330; *Bucco elegans*, Gm., *Capito maynanensis*, Gray); (5) *E. ERYTHROCEPHALUS* (Tsch. Faun. Per. p. 260) ex Peruv. Orientali; (6) *E. HARTLAUBI* (Lafr. Rev. Zool. 1845, p. 180, et 1849, p. 176, pl. 6; *Capito capistratus*, Eyton, Contr. Orn. 1849, p. 131, et *Megalamia capistrata*, ibid. 1850, p. 29, pl. 45) ex Bogota, fl. Napo, et Peruv. Orientali; (7) *E. GLAUCOGULARIS* (Tsch. Faun. Per. p. 259, pl. 24. f. 2) ex Peruv. Orient.

Of the genus *Capito*, besides the *C. cayanensis* and *C. peruvianus* and the intermediate *C. amazoninus*, there is a very beautiful fourth species, *C. aurovirens* (Le Vaill. Prom. Suppl. pl. E., *Bucco aurovirens*, Cuv.). This bird was met with at Sarayaçu on the Ucayali by MM. Castlenau and Deville during their voyage, and there are specimens in the Paris Museum from their collection. Mr. Gould possesses specimens obtained by Hauxwell on the same river.

The third and only remaining American genus of the family is *Tetragonops*, a very peculiar form from the Quitian Andes, described by Sir William Jardine in the Edinb. N. Phil. Journ. 1855, n. s. ii. p. 404.

75. *CHLORONERPES ERYTHROPS* (Vieill.).

Ega.

76. *CROTOPHAGA MAJOR*, Linn.

Rio Javarri.

77. *EURYPYGA HELIAS* (Pallas).

Rio Javarri.

78. *TIGRISOMA BRASILIENSE* (Linn.).

Rio Javarri.

79. *TIGRISOMA TIGRINUM* (Gm.).

Rio Javarri.

December 8, 1857.

Dr. Gray, F.R.S., V.P., in the Chair.

The following papers were read:—

1. ON A NEW SPECIES OF CASSOWARY.

By JOHN GOULD, F.R.S., V.P., ETC.

(Aves, Pl. CXXIX.)

I think it has been shown, that not only many species, but whole genera, and even great families of birds, formerly existed on the surface of the globe, of which no living representatives now remain, but



CASUARIUS BENNETTI, Gould.

G. F. Angas ad nat. del. J. Jennens lith.

W. West imp.

5 00 58

whose previous existence is made manifest to us by their foot-prints, the remains of their osseous structure, or portions of their egg-shells; some of these lived in periods of the most remote antiquity, while others are doubtless coeval with Man: of these latter probably not a few owe their extirpation to his wanton disregard for their perpetuity, such as the Dodo, the *Dinornis*, the Norfolk Island Parrot, &c.; their extinction being aided by their large size rendering them conspicuous objects, and by the circumstance of their being denizens of very limited areas, of small groups of islands, such as Mauritius, Madagascar, Norfolk and Philip Islands, &c. The great group of extinct struthious birds with which Owen and the younger Mantell have made us so well acquainted, is one which all ornithologists must regard with especial interest, and this interest will I doubt not be greatly enhanced when I state that I have undoubted evidence that a species pertaining to it, and hitherto unknown to us, is still living on our globe. These few prefatory remarks are given before introducing to the notice of the Society a most interesting communication which I have just received from George Bennett, Esq., of Sydney, respecting a new species of Cassowary lately discovered in the Island of New Britain, an example of which, apparently fully adult, is either now living at Sydney, or *en route* to Europe: that it may soon arrive, or if it should unfortunately die its skin may be duly preserved and sent to us, is my anxious hope. I am sure I need not expatiate upon the warm interest which our corresponding member, Dr. Bennett, has always manifested for the welfare of this Society, nor upon the value of the varied contributions he has made to natural science; it cannot fail to afford pleasure to us all to find, as will be seen, that this interest on his part is still undiminished. I think, therefore, that it will only be a just tribute of respect if we name the bird, of whose existence he has been the first to make us acquainted, in honour of himself, *CASUARIUS BENNETTI* (Pl. CXXIX.).

Of this particular section of the *Struthionidae*, then, there are the *C. galeatus*, a native of New Guinea, the *C. australis* inhabiting the Cape York district of Australia, and the *C. Bennetti*, whose domicile is the Island of New Britain.

The following are the details respecting this new species with which Mr. Bennett has favoured me:—

“ Sydney, Sept. 10, 1857.

“ MY DEAR GOULD,

“ I send you an account of a new species of Cassowary recently brought to Sydney by Captain Devlin in the cutter ‘Oberon;’ it was procured from the natives of New Britain, an island in the South Pacific Ocean near to New Guinea, where it is known by the name of ‘*Mooruk*.’ The height of the bird is 3 feet to the top of the back, and 5 feet when standing erect; its colour is rufous mixed with black on the back and hinder portions of the body, and raven black about the neck and breast; the loose wavy skin of the neck is beautifully coloured with iridescent tints of bluish-purple, pink, and occasional shade of green, quite different from the red and purple ca-

runcles of the *Casuarus galeatus*; the feet and legs, which are very large and strong, are of a pale ash-colour, and exhibit a remarkable peculiarity in the extreme length of the claw of the inner toe on each foot, it being nearly three times the length which it obtains in the claws of the other toes; this bird also differs from the *C. galeatus* in having a horny plate instead of a helmet-like protuberance on the top of the head, which callous plate has the character of and resembles mother of pearl darkened with black lead; the form of the bill differs considerably from that of the Emu (*Dromaius Novæ-Hollandiæ*), being narrower, longer, and more curved, and in having a black and leathery cere at the base and behind the plate of the head a small tuft of black hair-like feathers, which are continued in greater or lesser abundance over most parts of the neck.

"The bird is very tame and familiar, and when in a good humour frequently dances about its place of confinement. It is fed upon boiled potatoes and meat occasionally. The egg is about the same size as that of the Emu, and is of a dirty pale yellowish-green colour; I give this description from an egg obtained from the natives by Capt. Devlin.

"The bird appears to me to approximate more nearly to the Emu than to the Cassowary, and to form the link between those species. In its bearing and style of walking it resembles the former, throwing the head forward, and only becoming perfectly erect when running; it also very much resembles the Apteryx in the carriage of its body, in the style of its motion, and in its attitudes. It has been exhibited by Messrs. Wilcox and Turner in Hunter Street, Sydney.

"The accurate drawing which accompanies this letter was taken from life by Mr. G. F. Angas, whose correct delineation of objects of natural history is so well known; it conveys an excellent idea of the bird.

"Before closing my letter I have again examined the bird, and have to add, that its bill presents a good deal of the character of that of a Rail, and that it utters a peculiar whistling chirping sound; and I am informed that it also emits a loud one resembling the word 'Muruk,' whence no doubt is derived its native name. The existence of the species in New Britain or some of the neighbouring islands has been suspected for the last three years, and some time since a young specimen was procured, but unfortunately lost overboard during the voyage.

"Ever, my dear Gould,

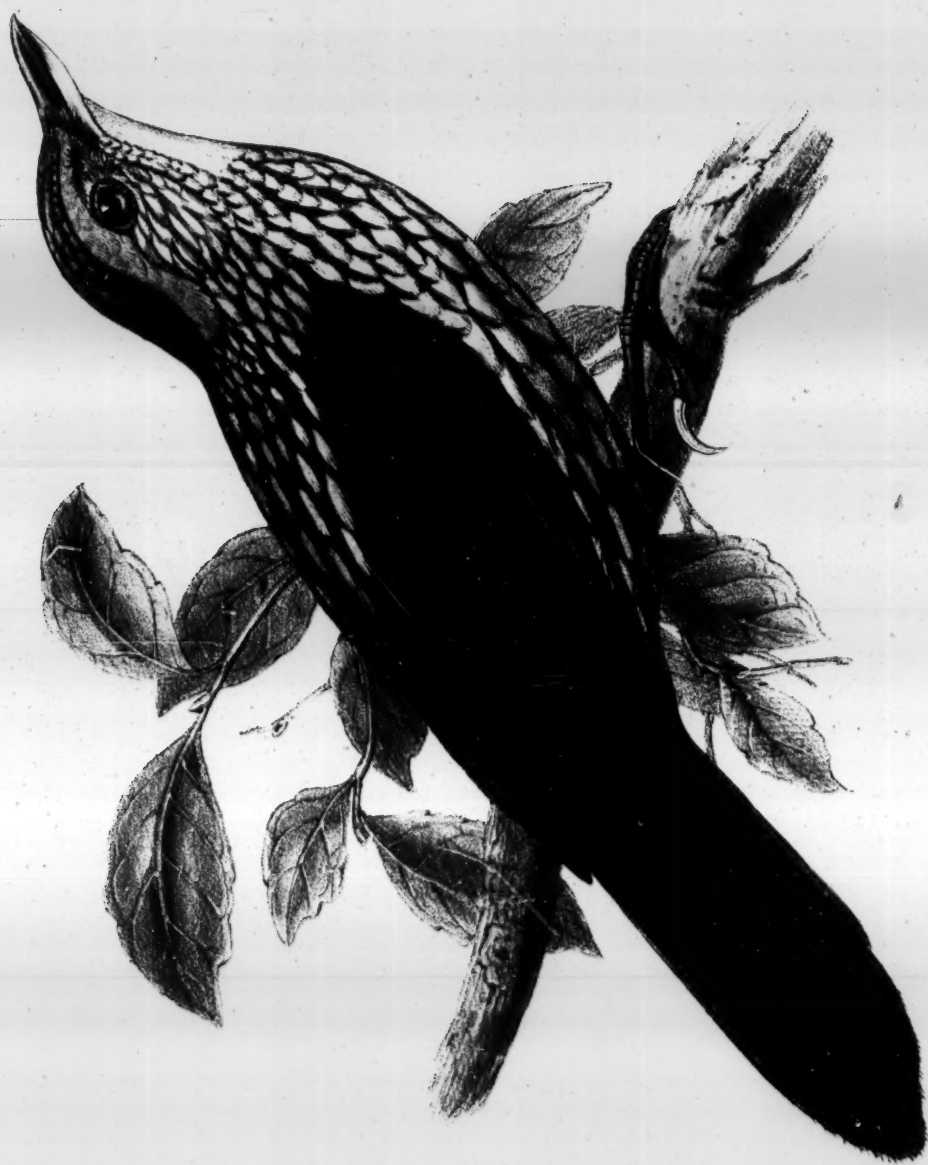
"Your sincere friend,

"GEORGE BENNETT."

As the bird has not yet reached this country, the fact of its being a new species must for the present rest upon Mr. Bennett's authority.

The account published by Mr. Wall of the discovery of the bird he has named *Casuarus australis* being but little known in this country, I have thought it might not be uninteresting to the meeting if I give a copy of it here as it appeared in the 'Illustrated Sydney Herald' of June 3, 1854.

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"The first specimen of this bird was procured by Mr. Thomas Wall, naturalist to the late expedition commanded by Mr. Kennedy. This was shot near Cape York, in one of those almost inaccessible gullies which abound in that part of the Australian continent. The Cassowary, when erect, stands about 5 feet high. The head is without feathers, but covered with a blue skin, and, like the Emu, is almost without wings, having mere rudiments. The body is thickly covered with dark brown wiry feathers. On the head is a large protuberance or helmet of a bright red colour, and to the neck are attached, like bells, six or eight round fleshy balls of bright blue and scarlet, which give the bird a very beautiful appearance. The first, and indeed the only, specimen of the Australian Cassowary was unfortunately left at Weymouth Bay, and has not been recovered. Mr. Wall being most anxious for its preservation had secured it in a canvas bag and carried it with him to the spot where, unfortunately for himself and for science, it was lost. In the ravine where the bird was killed, as well as other deep and stony valleys of that neighbourhood, they were seen running in companies of seven or eight. On that part of the north-eastern coast, therefore, they are probably plentiful, and will be met with in all the deep gullies at the base of high hills. The flesh of this bird was eaten, and was found to be delicious; a single leg afforded more substantial food than ten or twelve hungry men could dispose of at one meal. The Cassowary possesses great strength in its legs, and makes use of this strength in the same manner as the Emu. Their whole build is, however, more strong and heavy than that of the latter bird. They are very wary, but their presence may be easily detected by their utterance of a peculiarly loud note, which is taken up and echoed along the gullies; and it would be easy to kill them with a rifle."

The above account was furnished to the 'Illustrated Sydney Herald' by Mr. Wall's brother, Mr. William Sheridan Wall, Curator of the Australian Museum.

No skin of this species having yet been sent home, I am unable to say if the bird be really a new species, or identical with the New Guinea bird *Casuarus galeatus*. I trust, however, that the time is not far distant when some expedition more fortunate than the one to which Mr. Wall was attached may procure examples, and by making us better acquainted with the bird, enable us to decide this point.

2. DESCRIPTION OF ELEVEN NEW SPECIES OF BIRDS FROM TROPICAL AMERICA. BY PHILIP LUTLEY SCLATER.

(Aves, Pl. CXXX.)

1. CAMPYLORHYNCHUS PARDUS.

Supra albo nigroque tessellatus, alis nigris albo regulariter transvittatis: cauda nigra, rectricibus maculis magnis albis in utroque pogonio crebro transfasciatis: nucha brunnea: pileo

griseo, nigro punctato : superciliis et capitis lateribus albis, striga postoculari et rictali utrinque nigricantibus : subtus albus, gutture concolore, pectore, ventris lateribus et crisso maculis parvis rotundis notatis : tectricibus subularibus albis ; rostro brevior, debiliore, pallido, culmine corneo : pedibus nigris.

Long. tota 6·8, alæ 3·0, caudæ 3·0, rostri a rictu ·9.

Hab. In Nova Grenada in vicin. urbis S. Marthæ.

Mus. Brit.

This bird resembles most nearly *Camp. nuchalis* of Cabanis, or at least a member of this difficult group from Trinidad, which in my collection bears that name. In their upper surfaces these two species are not unlike, although the head is paler, the nape more brown, and both the inner and outer webs of the tail-feathers are banded in the present bird, which is not the case in the former. But below, *C. pardus* is readily recognized by its pure white colour, varied sparingly with round black spots on the breast, sides of the belly and vent. My type-specimen was received from S. Martha by Mr. Lawrence of New York, who kindly entrusted it to me for examination. I have called it "*pardus*" because it is the bird so named (but not described) by Prince Bonaparte in his Ornithological Notes upon Delattre's collections (page 43). The specimen there alluded to, which was received by MM. Verreaux of Paris from S. Martha, is now in the British Museum. It is apparently a younger bird than my type, but easily recognizable as of the same species.

2. CAMPYLORHYNCHUS STRIATICOLLIS.

Nigricanti-griseus ; uropygium versus magis rufescens, pennis obsolete nigro marmoratis : alis caudaque nigricantibus, marginibus externis nigro et rufo anguste variegatis : subtus albo-griseus, gula albicante ; cervice et pectore nigricante longitudinaliter striatis, ventre medio maculis rotundis obsoletis notato : ventri imo crissoque rufescentibus, nigro obsolete transvittatis : rostri pallide cornei culmine nigro ; pedibus nigris.

Long. tota 6·5, alæ 3·1, caudæ 2·7, rostri a rictu 1·0.

Hab. In Nova Grenada.

This is a typical *Campylorhynchus*, of which I have met with only one example, now in my own collection, selected from amongst a large number of Bogota birds. It does not seem very like any of the fourteen species of the genus which I have enumerated in the 'Proceedings of the Academy of Nat. Sciences of Philadelphia' (1846, p. 264). The upper surface is nearly uniform, being only obsoletely marbled, an appearance caused by the centres of the feathers being darker. The fore-neck is longitudinally striated and not spotted, as is more usual among these birds ; but there are round spots, not however very strongly marked, on the belly.

3. ANABAZENOPS GUTTULATUS, sp. nov. (Pl. CXXX.)

Olivaceus, superciliis ab oculo in nucham productis rufis : pilei pennis medialiter olivaceis, nigricante marginatis ; interscapulii

pennis medialiter pallide ochraceis, nigricanti-ochraceo utrinque limbatis, et quasi illo colore guttatis : alis intus nigricantibus, extus brunnescentibus : cauda unicolore ferruginea ; subtus gula albida, pectoris et ventris superioris plumis ochraceiscenti-albidis fulvo tinctis, marginibus fusco-olivaceo circumdati : lateribus et ventre imo terricolori-brunneis ; crisso rufo : rostri cornei apice et basi flavidis : pedibus flavido-fuscis.

Long. tota 7·0, alæ 3·3, caudæ 3·0.

Hab. In Venezuela, prope urbem Caracas (*Lerraud*).

Mus. Paris.

4. *SYNALLAXIS MULTO-STRIATA*, sp. nov.

Supra terricolori-brunnea, fronte et pileo antico rufis nigro variis : dorsi totius pennarum scapis flavo-albidis, strias longas formantibus ; cauda, e rectricibus duodecim, nigricante, brunneo marginata, subtus pallide brunnea : corpore subtus terricolori-brunneo, albo confertim vario, plumis medialiter albis, nigrescenti-brunneo irregulariter circumcinctis ; gula pure rufa : rostro nigro, pedibus fusco-nigris.

Long. tota 6·5, alæ 2·4, caudæ 2·8.

Hab. In Nova Grenada.

Mus. Paris.

A specimen of this apparently new *Synallaxis* is in the Gallery of the Jardin des Plantes at Paris. It is marked "Bogota, Rieffer, 1843." It does not very closely resemble any species with which I am acquainted, and is rather remarkable as being striated both above and below.

5. *TURDUS FULVIVENTRIS*, Verreaux, MS., sp. nov.

Nigricanti-cinereus, alis caudaque obscurioribus ; capite toto cum gutture nigris ; cervice antica fuscescenti-cinerea : abdomine toto cum tectricibus subalaribus saturate cinnamomeo-rufis : crisso fusco : rostro flavo, pedibus pallide brunneis.

Long. tota 10·5, alæ 4·8, caudæ 4·0.

Hab. In Nova Grenada (Bogota).

Mus. Acad. Philadelph. et P. L. S.

I have received a single example of this fine Thrush from MM. Verreaux, with the MS. name attached, which I have adopted. It is quite distinct from every other bird of the group hitherto described, but may be placed near *Turdus migratorius* of the U. S.

6. *TURDUS IGNOBILIS*, sp. nov.

Cinerascenti-fuscus unicolor, subtus dilutior, gula abicante, striis paucis cinereis : abdomine medio cum crisso albis, lateribus cinerascentibus : tectricibus subalaribus fusco-cinereis, rufo vix tinctis : rostro corneo, pedibus fusco-nigris.

Long. tota 9·0, alæ 4·5, caudæ 3·9.

Hab. In Nova Grenada.

Mus. Acad. Philadelph. et P. L. S.

I have had examples of this Thrush some time in my possession, and have indicated it without naming it in my first list of birds from Bogota (P. Z. S. 1855, p. 145, sp. 168). Having lately obtained other specimens, I have no hesitation in describing it as apparently unnamed, unless indeed it chance to be Prince Bonaparte's *Turdus luridus* (Notes Orn. p. 28), which however it is impossible to determine from so brief a notice. In its uniform style of colouring it resembles *Turdus fumigatus* of Brazil and *T. grayi* of Mexico, but may be immediately distinguished by the colour of the under wing-coverts, which are cinereous like the breast, with a faint tinge only of rufous. There are two examples of this same bird in the collection of the Academy of Natural Sciences of Philadelphia, also labelled "Bogota."

7. *CINCLUS LEUCONOTUS*, sp. nov.

"*Cinclus leucocephalus*, Tsch." ; Lafr. Rev. Zool. 1847, p. 68.

Niger: pileo cum nucha, dorso medio et corpore subtus ad imum ventrem albis: crisso et hypochondriis nigris: pileo nigro striolato: rostro nigro, pedibus corneis.

Long. tota 5.5, alæ 3.8, caudæ 1.6, rostri a fronte .6.

♀ (?). *Mari similis sed minor, rostro brevior.*

Long. tota 5.0, alæ 3.1, caudæ 1.5, rostri a fronte .4.

Hab. In Nova Grenada et rep. Equatoriana.

Mus. Paris., Gul. Jardine Baronetti, et P. L. S.

This species is not the *Cinclus leucocephalus* of Tschudi, as I ascertained this summer by taking my specimens to Neufchatel and there comparing them with the type. Tschudi's bird is much larger and has the white below confined to the breast, and no white back. It is in short quite a different bird. The most peculiar thing however about my two specimens is, that one is larger than the other, and has the bill strikingly longer. After some hesitation I have attributed this to sex, though I am not aware of a similar difference occurring in the bills of other *Cincli*. I may remark, however, that though this bird is seemingly much like *Cinclus* in form, I cannot help thinking that, when we know more about it, we may find occasion to refer it to a different genus. My examples were picked out of a large number of ordinary Bogota skins, of which they have the usual unmistakeable appearance. The bird described by Lafresnaye was brought from Pasto by Delattre, and a specimen in the Paris Museum—marked *Cinclus leucocephalus*—is said to be from the vicinity of Quito. Sir William Jardine possesses examples from the same locality.

8. *TYRANNUS ATRIFRONS*, sp. nov.

T. supra pallide cineraceo-brunneus; vitta frontali inter oculos nigra, crista pilei medii celata aurea: alis nigricanti-brunneis, extus rufo late marginatis: tectricibus caudæ superioribus cum cauda tota rufis, rectricum (precipue mediarum) parte media nigricante: subtus flavus; gula albicante, pectore rufo paulum mixto, tectricibus alarum inferioribus pallide flavis,

remigum pogoniis internis subtus ochraceis : rostro et pedibus nigris.

Long. tota 8·2, alæ 4·6, caudæ 3·75.

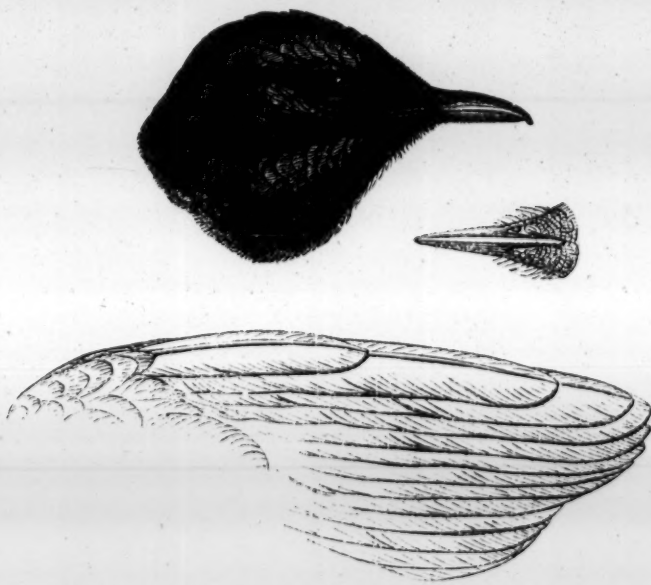
Hab. In littoribus reipub. Equatorianæ.

Mus. Brit. et T. C. Eyton.

Mr. Eyton's collection contains the type-specimen of this very well-marked species of Tyrant, which I believe to have been hitherto overlooked. It is labelled "Guyaquil," and that is no doubt its right locality, for two examples of the same bird in the British Museum were obtained on the island of Puna in the gulf of Guyaquil by Mr. Barclay.

MELANOPTILA, gen. nov.

Melanoptila, genus novum e familia TURDIDARUM. Rostrum rectum, modicæ longitudinis, fere ut in genere *Turdo*, sed tenuius et vibrissis rictalibus nullis: alæ breves, ad finem sub-caudalium attingentes, remige prima brevi, secunda secundarias co-æquante, tertia longiore, sed a quarta, quinta, et sexta, æqualibus et longissimis, superata: cauda longa, apice rotundata: pedes antice scutellatæ prout in genere *Turdo*.



9. *M. GLABRIROSTRIS*, sp. nov.

M. nigra unicolor, cæruleo-nitens : alis caudaque æneo magis splendentibus : rostro et pedibus nigris.

Long. tota 7·8, alæ 3·5, caudæ 3·3, tarsi 1·05.

Hab. In rep. Honduras, prope urbem Omoa.

I first observed specimens of this curious bird in the Derby Museum at Liverpool. They were procured in Honduras by Delattre, and an excellent example from the same source is in the British Museum. A single specimen in my own collection was obtained, with other birds, by Mr. Joseph Leyland in the vicinity of Omoa at the extremity of the Bay of Honduras. I know of no other American form which much resembles it in plumage or in structure, and am rather puzzled as to its proper arrangement in the Natural System. It must however, I think, come within the limits of the family *Turdidae*, and for the present I am rather inclined to place it along with the Mock-birds (*Miminae*), with the general structure of some of which it seems most nearly to accord, except in the absolute want of any signs of rictal bristles, whence I have called it *glabrirostris*.

Mr. Leyland informs me, with regard to this bird at Omoa, that he believes it is rare there, as he only saw one other individual during his stay. It frequents the low thick bushes.

Further information concerning the difference of the sexes, habits and internal structure of this interesting bird are requisite, before its true position can be satisfactorily established.

10. *LIPAUGUS RUFESCENS*.

Rufescenti-brunneus, subtus clarior, capite et pectore subtilissime nigro, vittas obsoletas formante, transfasciatis: pennarum maculis apicalibus rotundis in pectore et ventre medio et in crisso sparsis, nigris: remigibus nigricantibus intus et extus rufo marginatis: alarum tectricibus superioribus rufis nigro variegatis, inferioribus rufis, fascia axillari crocea: cauda unicolore, rufescenti-brunnea: gula et crisso pure rufis: rostro nigricante, pedibus fuscis.

Long. tota 5·7, alæ 4·4, caudæ 3·3.

Hab. In rep. Guatimalensi prope urbem Coban (*Delattre*).

Mus. Britannico et Derbiano.

I examined an example of this bird with much care during an inspection of some of the riches of the Derby Museum at Liverpool, two years ago, and attached to it the MS. name which I now publish. Through the kindness of Mr. Thomas Moore I have lately had the opportunity of studying it a second time. Mr. G. R. Gray has obligingly pointed out to me a stuffed specimen in the British Museum, which is evidently the adult of this species, that in the Derby Museum being in an immature state; and I have therefore modified my original description, so as to render it applicable to the more perfect bird. In the younger stage the marking on the wings is not so decided, and the characteristic black spots on the breast, belly and crissum, and the axillary tufts, are absent. The specimen in the British Museum was procured from MM. Verreaux, and is labeled with the MS. name "*Lathriosoma typicum*, Bp." It is not however necessary to create a new generic name for this bird, as it certainly cannot be separated from *Lipaugus hypopyrrhus* (Vieill.),

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for which the term *Aulea** (taken from Dr. Schiff's MS.) has been already published by Prince Bonaparte. It forms, in fact, an excellent second species of this division, which seems to serve as a connecting link between the genera *Lipaugus* and *Heteropelma*, and is perhaps worthy of generic rank.

11. TINAMUS CASTANEUS, sp. nov.

Saturate castaneus, capite et cervice undique cum gula nigricanti-cinereis, pileo nigricantior, gula magis cinerascens: alarum pennae nigricantibus, tectricum et secundariarum marginibus externis dorso concoloribus: ventre imo cum cauda (tectricibus supra-caudalibus omnino abscondita) nigro et cervino flammulatis: rostri mandibula superiore nigricante, hujus autem tomis cum mandibula inferiore flavidis: pedibus carnis.

Long. tota 8.5, alae 5.5, caudae 1.3, rostri a recto 1.1, tarsi 1.9.

Hab. In Nov. Grenada interiore (Bogota).

Mus. P. L. S.

I obtained a single specimen of this Tinamou out of a large collection of Bogota skins in the hands of a dealer. I have in vain attempted to find a name for it, and have looked through the examples of these birds in the great Museums of Leyden, Paris and Philadelphia without finding a similar one. In the British Museum, however, is a specimen possibly referable to the young stage of this species.

The present bird agrees in size and shape tolerably well with *T. parvirostris* and *T. tataupa*, but is quite different in colouring from any member of the group with which I am acquainted.

3. ON THE DUKER BOKS IN THE SOCIETY'S GARDENS.
By DR. J. E. GRAY, F.R.S., F.L.S., V.P.Z.S. AND ENT. SOC.

(Mammalia, Pl. LVII.)

In the text to the 'Knowsley Menagerie,' and in the 'Catalogue of the Hoofed Quadrupeds' in the British Museum, I divided the Duker Boks into three species. The distinctness of these species has been doubted.

As there is now in the Gardens of the Zoological Society specimens of two of the species, and as each of these has bred there, I considered that it might be advantageous to give a figure of the male of each species, side by side, on the same plate.

1. The Impoon, *Cephalophus Grimmi*, Gray, Catalogue, Ungulata, p. 78, orbit and beneath white. There are in the Gardens a female and three young males.

2. The Burchell's Buck Bok, *Cephalophus Burchellii*, Gray, Cat.,

* Prince Bonaparte writes this word '*Aulea*,' but if, as I suppose is the case, it comes from *αὐλός*, *tibia*, the proper adjectival form would be *autilus*.

Ungulata, p. 81, dark, orbits and under side dark. There is a female, and a young male, her offspring.

The two sexes, and the young and the old specimens of each of the species are exactly similar.

4. NOTICE OF A NEW SPECIES OF JAGUAR FROM MAZATLAN, LIVING IN THE GARDENS OF THE ZOOLOGICAL SOCIETY. BY DR. J. E. GRAY, V.F.Z.S., F.R.S., ETC.

(Mammalia, Pl. LVIII.)

The Society has recently received from Miss Mary Knight a very curious and valuable animal from Mazatlan, which appears not hitherto to have been noticed in the systematic catalogues, which is the more extraordinary, as the zoologists in the United States are now very active in describing the animals of North America, and are evidently renaming several of those which are well known in the European Museums.

This species greatly resembles the Jaguar in size, character, and marking, having the short legs and short tapering tail of that species; but it chiefly differs from that animal in the form of the head, which is more elongate, and in the disposition of the spots; instead of the spots being all placed in rings or roses, as they are usually called, the spots on the front part of the body are single and scattered, and those on the hinder part of the body are alone placed in rings or roses.

I propose to distinguish the species provisionally with the name of *Leopardus Hernandezii*, waiting until its skull and other characters can be more carefully examined and compared before I undertake to give its proper specific character.

5. SYNOPSIS OF THE FAMILIES AND GENERA OF AXIFEROUS ZOOPHYTES OR BARKED CORALS. BY DR. JOHN EDWARD GRAY, F.R.S., F.L.S., V.P.Z. AND ENT. SOC., ETC.

(Radiata, Pl. IX.)

This group of animals has been called

Polypiers corticifères by Lamarck, Hist. A. S. V. ii. 288.

Polypes corticaux by Cuvier, Règne Anim. iv. 78, 1817.

Corallea by De Blainville, Dict. Sci. Nat. lxx., et Man. Actinol. 501, 1834.

Gorgoniadæ, Johnston, Brit. Zooph. 182, 1838; Gray, List of B. Mam. 55, 1848.

Gorgonidæ, Dana, Zooph. 637, 1846.

Cerato-corallia, Ehrenb. Corall. B.M. 1834.

Coralliadæ, Gray, Syn. B.M. 134, 1840.

This group of animals is easily distinguished from the other zoo-

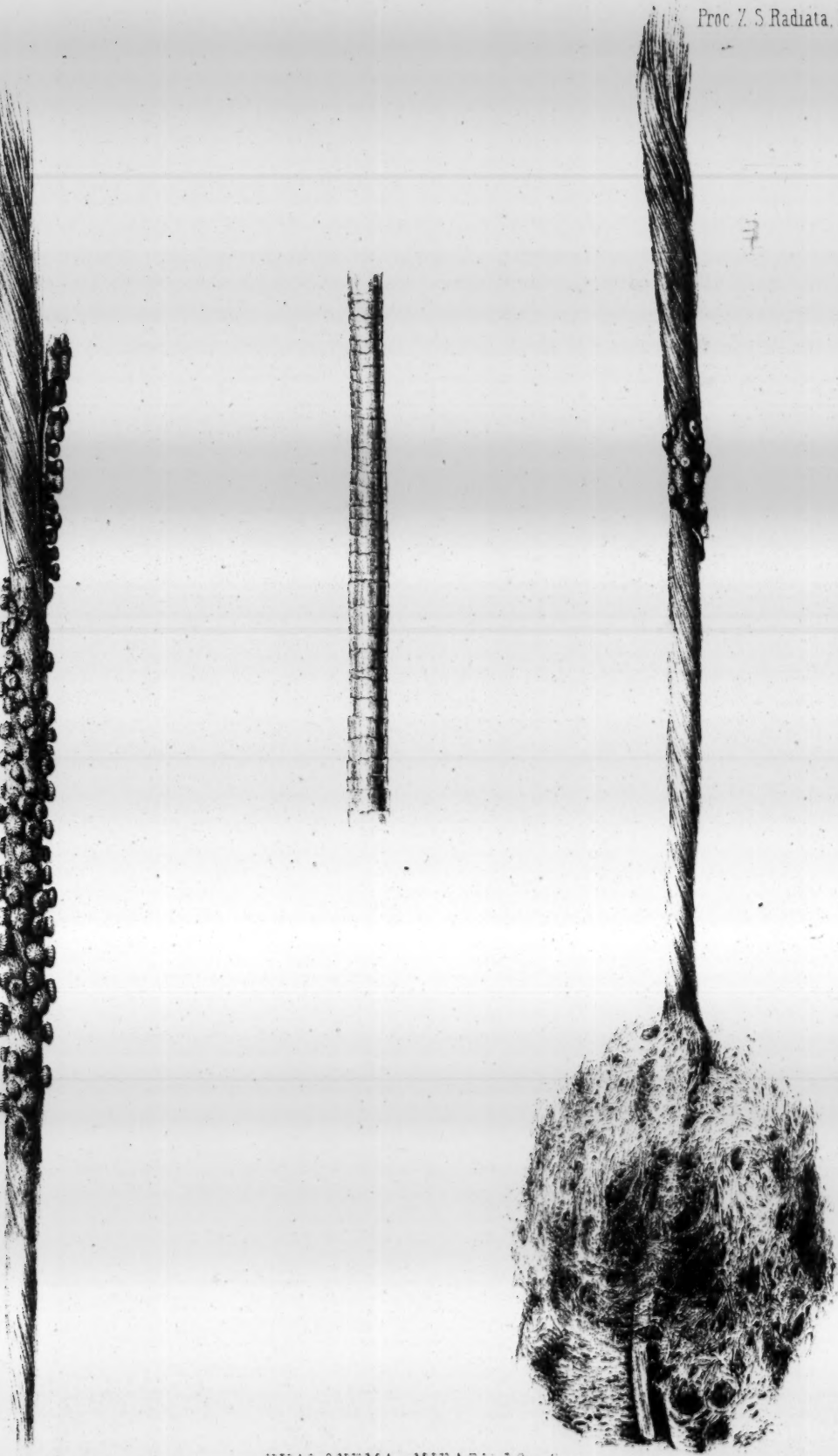


M. G. L. HANCOCK, Imp.

W. E. RICHMOND, Jr., Del.

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HYALONEMA MIRABILE. Gray

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phytes by the mass of animals being supported by a continuous axis. The axis is generally formed of one (or rarely of many elongated) siliceous, calcareous, or horny body, extending from the base to the apex of the coral mass. The axis, whether consisting of horny, stony, or siliceous matter, is always formed of numerous concentric, very thin laminæ, more or less intermixed with mineral matter. Those which have a horny or calcareous axis are generally branched, and are uniformly fixed by an expanded base to some marine body.

The single known kind which has a siliceous axis: the axis is formed of many twisted fibres, and its lower end, instead of being expanded, is gradually tapering and is parasitically imbedded in a fixed sponge, and thus kept in its erect position.

These corals have sometimes been confounded with some of the more branched or tree-like *Alcyoniens*, or fleshy zoophytes. But the coral mass of these animals has no distinct continuous axis, being only strengthened by more or less numerous spicula imbedded in the flesh of the mass, as is the case in the animal part of these zoophytes that covers the axis.

In some genera, as *Briareus*, these spicula are more crowded together in the centre of the mass, forming a harder centre to the stem and branches; but this axis-like body, which is formed of an immense number of spicula, must not be confounded with the continued axis of the true Barked Zoophytes, which may be regarded as fleshy zoophytes, which are in addition furnished with a central axis to support their more branched form.

They may be best divided into three distinct subdivisions, according to the chemical composition of the axis, thus—

1. *Hyalophytes*.
2. *Lithophytes*.
3. *Ceratophytes*.

Suborder I. HYALOPHYTA.

Axis siliceous.

Family 1. HYALONEMADÆ.

Coral subcylindrical, rather attenuated and immersed in a fixed sponge. Axis in the form of numerous elongated, slender, filiform, siliceous fibres, extending from end to end of the coral, and slightly twisted together like a rope. Bark fleshy, granular, strengthened with short cylindrical spicula; polypiferous cells scattered, rather produced, wart-like, with a flat radiated tip.

1. HYALONEMA, Gray.

The character of the family.

1. HYALONEMA MIRABILIS. (Pl. IX.)

B.M.

Hyalonema mirabilis, Gray, Syn. B.M. 1830, 118.

Hyalonema Sieboldii, Gray, Proc. Zool. Soc. 1835, 63; Dana, Exped. 642.

Japan (*Sir Hans Sloane, Siebold*).

The coral, as it is usually seen, consists of three distinct portions, of very different texture and appearance—the axis, bark, and the sponge.

The axis is formed of a considerable quantity of transparent glass-like fibres, slightly twisted from right to left into a spiral rope-like bundle 18 to 20 inches in length and 3 or $3\frac{1}{2}$ lines in diameter at the lower part, where the fibres are most closely applied to each other, and whence the specimen gradually expands upwards to a diameter of double that extent.

The part above this tapering base is in different specimens covered to a greater or less extent (and evidently in the perfect state is entirely) with a kind of leathery bark, with large truncated nipple-shaped scattered tubercles, having flat crowns with radiating grooves and a central depression.

The base of the transparent rope is (in one specimen) as it were inserted into an irregular mass of a very loose spongy substance, to which it is very firmly attached; and in passing through which it gradually tapers to about half the size of the narrowest portion of the exposed part, and finally terminates in a truncated pencilled base of very fine capillary fibres. In general, the specimens are withdrawn from this spongy base, and the lower part of the axis is cleaned; but I think it is evident that they all are attached to such a sponge in their natural state.

The bark is formed of two distinct layers: the outer having the appearance of an aggregation of grains of sand united together by a small quantity of animal matter; the inner portion having imbedded in its substance numerous very fine capillary fibres of precisely similar texture to those which form the axis of the coral, but of much smaller size; and this portion of the bark evidently extends between and invests each of the fibres of the rope-like axis.

The fibres which form the axis are perfectly transparent, colourless, and moderately flexible, resembling in appearance those of spun glass or very clear bristles. They vary in thickness from half a line to the diameter of a very fine hair. In the middle portion they are nearly cylindrical; within 2 or 3 inches of the tip they gradually taper to half their former diameter; externally they appear to the naked eye smooth and polished, but as if furnished with numerous internal cracks taking different directions. Under the microscope there are seen many close-set superficial annular grooves, which become more evident near the tips, where they assume the form of raised belts most prominent below, and giving a somewhat irregular outline to the surface. Internally they are solid, and formed of very numerous, very thin, concentric coats, as may be seen by breaking them transversely, when, instead of presenting a straight fracture, the coats appear of different lengths, in consequence of their yielding at different intervals. If this fracture is minutely examined under a lens, each of its component laminæ is found to present numerous concentric lines, showing it to be formed of several plates. But this structure is most evidently seen on applying the end of one of the broken fibres to the flame of a spirit lamp, when

it becomes first opaque and silvery, then crepitates, enlarges, and assumes a dull white colour; after which the different laminæ, which are very numerous, separate from each other. If a larger portion of the fibre is exposed to the flame, its outer coat is elevated in flakes, and the whole substance splits longitudinally on one side in such a manner as to exhibit a section of the various coats.

Each of the fibres or spicula of the axis is enveloped in a thin membrane connected with the bark, and which doubtless deposits the very numerous concentric coats of which it is formed, as the bark deposits the concentric coats of which the axes of *Gorgonia*, *Coralium* and *Isis* are formed.

The number of fibres in the axis appears to increase as the coral grows, as some are much thinner than the rest, while they all extend from the base to the apex of the coral. The part of the fibre which is enclosed in the sponge does not appear to increase in thickness so fast as the other part of the fibre, and it is not covered with any bark.

The late Dr. Prout and Mr. Pearsall have furnished me with the following account of the chemicals constituent of these fibres:—

“When this coralloid substance is exposed to heat it decrepitates strongly; and if the experiment be made in a tube and the heat suddenly applied, it bursts to pieces with a sort of explosion, and gives off a perceptible quantity of water, and yields a strong peculiar fishy odour. Under the blowpipe it melts into a porous slag, so light as to swim in water, and reminding one of the substance called Tabasheer, the addition of a little alkali converts it into pellucid glass. These experiments show that this substance consists principally of hydrated silica.

“W. PROUT.”

“To J. E. Gray, Esq.

“The Royal Institution,
Friday Evening, April 18th, 1832.

“DEAR SIR,—I have examined the peculiar organic formation which you showed the structure of by the microscope when I had the pleasure of seeing you last: indeed I had more than one specimen of marine produce, but the present had something of this appearance.

“When heated in very small glass tubes, portions of these *spines* decrepitated violently, and gave off much water, but no appearance of ammonia, so that very little, or perhaps no trace of organic matter can be expected to remain.

“The acids (sulphuric, muriatic, and nitric) did not seem to affect them even when pulverized and boiled together.

“They certainly are *not carbonate of lime*.

“I obtained very minute traces of *sulphuric acid and lime*; but so very inappreciable, except by the slightly turbid appearance when viewed between the source of light, that, if the indications proceed from the spines or not, they must be considered as accidental.

"The spines are *not sulphate of lime*, but I consider them to be silica; for after much boiling in silver vessels, although they scarcely seemed affected by caustic alkali, yet, when heated to redness, they fused and lost all traces of regular form, and the whole of the fused mass, small as it was, became entirely soluble in water. When muriatic acid was added, the silica was precipitated with the usual gelatinous and flocculent appearances; the only chance is that alumina may possibly be present. I tried one of the blowpipe tests for alumina, and there seemed to be the appearance of this substance; but I think the test is subject to fallacy. So I conclude that the substance is silica only; the water—does it proceed from cells, or is it held accidentally?

"I shall be curious to know the history, which I believe you promised after my reporting upon their composition, and of course wish to know how far you consider this examination corresponds to the impression on your own mind; for I think you told me that more than one chemist had given an opinion, which possibly may differ from mine.

"Believe me to be,

"Respectfully and sincerely,

"THOMAS JOHN PEARSALL."

The sponge to which it is attached has no real connection with the coral, except as affording it the means of support, and is of the common structure.

Some fibres of the axis of this coral were in the collection of Sir Hans Sloane, and it was doubtful to which kingdom these isolated siliceous threads could belong, until the arrival in this country of the specimen, which was sent from Canton by Mr. Reeves, under the name of *Glass plant*, described by me in the paper above referred to.

There can be no doubt, after the examination of the two specimens in the British Museum, one in my own collection, one in Paris, and several in the Leyden Museum, that the bark evidently belongs to the axis, and that this coral is a true zoophyte, and not a sponge covered with a parasitic zoophyte, as it is regarded by M. Valenciennes. See Milne-Edwards, *British Fossil Corals*, 81.

Suborder II. LITHOPHYTA.

Axis calcareous, continued or jointed, effervescing with muriatic acid.

In the genus *Subergorgia* the axis is cork-like; in the other genera it is ligneous, more stony and hard at the base; in others it is entirely stony and hard, and usually of a white colour; but in *Corallium* it is generally deep bright red, but sometimes pink or white. In general it is solid, and formed of concentric laminae. In *Melitaea* and *Solanderia*(?) it is cavernous, pierced with cylindrical tortuous canals.

Fam. 2. ISIDÆ.

Coral branched, tree-like or fan-shaped, with anastomosing branches. Axis hard, articulated, composed of alternating portions of hard calcareous and flexible horny black matter. Bark granular, smooth, with irregular-shaped calcareous spicula; polypiferous cells simple, more or less exerted.

1. ISIS.

Cynosaire, Lamk.

Hippurium, Oken.

Coral branched, furcate. Axis striated, branches proceeding from the calcareous articulations. Bark thick, with a few interspersed, very irregular and unequal spicula. Polypiferous cells scattered over the whole surface, sunken. Base of coral expanded, tuberoso.

The bark is permanent and hard, but is brittle, easily removed, especially if the specimens are not kept in a dry place. Lamarck, who had only seen the coral without the bark, describes it as "*caduce en totalité*," &c., p. 300.

The articulations between the joints generally become obliterated near the base of the coral of the older specimens, either by the contraction and solidification of the horny part, or by the horny portions becoming covered with a calcareous deposit. Lamarck regarded the coral in this state as a different genus, which he named *Cynosaire*, Mem. Mus. i. 467. See Seba, iii. t. 105. n. 3.

1. ISIS HIPPURIS.

B.M.

Isis hippuris, Linn.; Ellis, Zooph. t. 3. f. 1, 5 (with bark); Seba, iii. t. 205. no. 3 (old stems); t. 110. nos. 1 & 2 (upper branches with bark); Esper, t. 1, 2 (upper branches), t. 3 (old stems), t. 3 a. f. 1, 2 (bark).

2. ISIDELLA.

Coral branched, furcate. Axis smooth, cylindrical, stony, joint elongate; branches furcate, proceeding from the corneous joint. Bark rather thick, with irregular opaque spicula; polypiferous cells produced, subcylindrical. Base of axis expanded, lobed and branched.

1. ISIDELLA ELONGATA.

B.M.

Isis elongata, Esper, t. 6; Seba, iii. t. 6. f. 4.

I. gracilis, Lamk. Pol. Flex. t. 18. f. 1.

Mopsea mediterranea, Risso, E. Merid. 322. f. 1.

M. elongata, Philippi, Wieg. Arch. 1842, 38.

M. gracilis, Dana.

? *M. erythracea*, Ehrenb.

The branches of *I. elongata* are said to be often anastomosed, and for this reason it appears to be separated from *I. gracilis*; but I have never seen them in that state (Lamx. Pol. Flex. 477).

Mediterranean; Red Sea (Ehrenb.); ? West Indies (Lamx.).

2. ISIDELLA ? CORALLOIDES.

Isis coralloides, Lamx.
South Sea.

3. MOPSEA.

Mopsea, Lamx.

Coral branched, fan-shaped, branches pinnate. Axis jointed, stony joint short, branches from the horny articulation. Bark hard, with imbedded spicula; polypiferous cells produced, wart-like, sub-verticillate, ascending, rather incurved.

1. MOPSEA ENCRINULA.

Isis encrinula, Lamk.

Mopsea verticillata, Lamx. Pol. Flex. t. 18. f. 2.

M. encrinula, Ehrenb.

Australia.

Fam. 3. MELITEADE.

Coral branched, branches furcate, often anastomosing. Axis spongy, permeated with flexuous cylindrical canals, continued or interrupted with harder swollen calcareous joints. Bark granular, almost entirely composed of transparent calcareous spicula. Polypiferous cells in series on the edge of the stem and branches.

1. SOLANDERIA.

Solanderia, Duchassaing.

"Axis continued, resembling the non-calcified joints of *Melitea*."
Bark thin, rather cottony.

1. SOLANDERIA GRACILIS.

Solanderia gracilis, Duchass. Rev. Zool. 1846, 218.

Guadaloupe.

2. MOPSELLA.

Axis articulated, segments elongated, stony, with short swollen hard and porous joints. Base of the axis expanded, not lobed. Bark permanent, granular with scattered spicula, cells prominent, swollen.

1. M. DICHOTOMA.

B.M.

Isis dichotoma, Pallas; Esper, t. 5, t. 11. with bark (Petiver, Gazoph. t. 3. f. 10); Hermann, Naturf. xv. 135. t. 5. f. 1.

Mopsea dichotoma, Lamx. 466 (not Seba, t. 106. f. 4).

3. MELITEA.

Coral branched, furcate, often anastomosing. Axis composed of narrow, solid, striated, calcareous segments and swollen spongy grooved joints; base of the axis expanded, not lobed. Polypes in

four or five longitudinal series at end of branches (Esper, t. 4 a. f. 4, 5, see t. 11. f. 2, bark). Cells sunken.

* *Tree-like, branched.*

1. MELITÆA OCHRACEA. B.M.

Melitæa ochracea, Lamk. ; Meyen, Nov. Acta Leop. xvi. t. 29.
Isis ochracea, Linn. ; Esper, t. 4, t. 4 a, t. 11, f. 1, 2, 3, with bark.
Corallium rubrum, Ellis, Phil. Trans. iv. 188. t. 3.

** *Flabelliform, reticulated.*

2. MELITÆA AURANTIA. B.M.

Isis aurantia, Esper, t. 9.
Melitæa retifera, Lamk.
 India.

3. MELITÆA COCCINEA, Lamk. B.M.

M. Rissoi, Lamk.
Isis coccinea, Solander, Z. t. 12. f. 3 (cop. Esper, t. 3 a. f. 5) ;
 Esper, t. 16.

4. MELITÆA TEXTIFORMIS. B.M.

Melitæa textiformis, Lamk. Pol. Flex. t. 19. f. 1.
 Australia.

5. MELITÆA TENELLA.

M. tenella, Dana, Exped. 683.
 Sandwich Islands.

Fam. 4. PRIMNOADÆ.

Coral branched, branches forked or pinnate.⁴ Axis calcareous, smooth, or slightly longitudinally striated. Bark formed of flat scales. Polypiferous cells produced, covered with regularly disposed imbricate scales.

1. PRIMNOA.

Primnoa, Lamx. 1812.

Coral branched, tree-like, branches cylindrical, forked. Bark formed of scales. Polypiferous cells ovate, clavate, dependent, covered with two series of large convex imbricate scales, placed in whorls of three round the branches. Aperture closed, with three small pointed scales.

* *Coral tree-like and branched, branches forked. Cells ovate, bell-shaped, in threes. Primnoa.*

1. PRIMNOA LEPADIFERA, Lamx. B.M.

Gorgonia lepadifera, Linn. ; Baxter, Opusc. ii. t. 13. f. 10, Soland. Zooph. t. 13. f. 1, 2 ; Johnst. B. Zooph. f. 37.
G. reseda, Pallas.
 North Sea ; Archangel ; Norway.

** *Coral simple, with simple branches spreading on all sides.*

2. PRIMNOA ANTARCTICA.

P. antarctica, Valenc. Voy. Venus, t. 12. f. 2.
South Polar Sea and Falkland Islands.

2. CALLOGORGIA.

Coral forked, fan-shaped; branchlet pinnate. Axis continued, stony, compressed. Bark thin, white, formed of flat angular imbedded granules. Cells in whorls of three, cylindrical, incurved, covered with small imbricate scales.

1. C. VERTICILLATA.

B.M.

Gorgonia verticillata, Pallas; Esper, t. 42.

G. verticillaris, Solander.

Prim. verticillata et *P. flabellum*, Ehrenb.

Muricea verticillaris, Dana.

Keratophyte (Sea Feather), Ellis, Corall. t. 26. f. S. T. V.
Mediterranean; Madeira.

PRIMNOELLA.

Coral simple, elongate, cylindrical. Axis continued; stony. Bark granular, smooth. Polypiferous cells numerous, close pressed, sub-cylindrical, regular, small, placed in close regular circles, each containing many cells round the stem; each cell covered with two series of small imbricate scales.

PRIMNOA AUSTRALASIE.

B.M.

Primnoa australasie, Gray, P. Z. S. 1849, 146; Radiata, pl. 2. f. 8, 9.

Australian Seas, on oyster-shells and stones.

Fam. 5. CORALLIDÆ.

Axis inarticulate, solid, calcareous, more or less hard and stony. Bark smooth, granular, with irregular-shaped calcareous spicula. Polypiferous cells simple, more or less exerted.

The chemical character of the axis may be easily discovered by a small quantity of muriatic acid.

1. CORALLIUM.

Corallium, Lamk. 1813.

Isis, Oken, 1815.

Coral tree-like, branched, forked. Axis hard, continuous, stony, striated externally. Bark granular, when dry formed almost entirely of irregular spicula (see Ellis, Zooph. t. 13. f. 3, 4). Polypiferous cell homogeneous, scarcely exerted, scattered over the surface of the branches.

* *Shrub-like, spreading.* Corallium.

1. C. NOBILE, Ehrenb.

B.M.

Isis nobilis, Linn.

Gorgonia pretiosa, Solander, Zooph. t. 13.

Corallium rubrum, Carolini, t. 2.

Mediterranean.

*** *Fan-shaped, branches on a plane.*

2. CORALLIUM SECUNDUM.

Corallium secundum, Dana, Exped. t. 60. f. 1.

Sandwich Islands.

2. ANNELLA.

Coral rather fan-like, sinuous, branched; branches subcylindrical, rather compressed, inosculating. Axis continuous, soft, woody, white, calcareous, effervescing in muriatic acid, flexible. Bark moderately thick, granular, with imbedded spicula, without any impressed lateral grooves, with numerous equally diffused small circular imbedded polypiferous cells, aperture closed with eight keeled conical valves, forming a rather convex cone (which are absent in the worn specimens).

1. A. RETICULATA.

B.M.

3. ELLISELLA.

Coral simple or furcately branched; branches subcylindrical, with a more or less distinct lateral groove, especially at the base. Axis continuous, opaque, solid, calcareous, hard at the base, white and softer above. Bark when dry granular, thin, with numerous series of sunken or slightly prominent polypiferous cells on each edge of the stems and branches.

* *Coral simple, subcompressed beneath.* Junceella, Valenc.

1. E. JUNCEA.

B.M.

Gorgonia Juncea, Pallas; Esper, t. 52?; Seba, Thesaur. t. 105.

f. 1 a, left figure.

Junceella Juncea, Valenc.

** *Coral furcately branched, branches subcylindrical.*

2. E. ELONGATA.

B.M.

Gorgonia elongata, Pallas; Esper, t. 55.

3. E. COCCINEA.

B.M.

Branches very long, virgate, bright scarlet.

*** *Coral branched, fan-like; branches with a series of virgate branches on the upper side only.* Ctenocella.

4. E. PECTINATA.

B.M.

Gorgonia pectinata, Pallas; Seba, Thes. t. 105. f. 1 a, central figure.

Pterogorgia pectinata, Dana, n. 17.

4. SUBERGORGIA.

Subergorgia, Gray, P. Z. S. 1857, p. 159.

Coral branched, forked, rather fan-shaped. Axis compressed, continuous, opaque, calcareous, cork-like, formed of rather loose laminae. Bark when dry granular, with a distinct impressed groove on each side of the stem and branches. Polypiferous cells rather prominent, simple, in two or three series on each edge of the stems and branches.

* *The stem subquadrate; lateral groove deep, broad; cell rather tubercular.*

1. SUBERGORGIA SUBEROSA.

B.M.

Gorgonia suberosa, Pallas (not Solander); Esper, t. 49; Ellis, Coral. t. 26. f. P. Q.

Gorgonia sulcifera, Lamk.

Pterogorgia sulcifera, Dana, no. 16.

Subergorgia suberosa, Gray, P. Z. S. 1857, p. 159.

Branches gradually attenuated, virgate, straight, rarely anastomosing.

** *The stem compressed, broad lateral grooves, narrow; cells scarcely prominent.*

2. SUBERGORGIA COMPRESSA.

B.M.

The branches slender, diverging, arched.

5. SCIRPEARIA.

Scirpearia, Cuvier, 1817.

Funiculina, sp., Lamk. 1816.

Coral slender (simple or subsimple), rod-like. Axis slender, cylindrical, hair-like, solid, white, calcareous, attached by a broad base. Bark (when dry) thin, smooth, granular, with a series of subcylindrical polypiferous cells placed alternately on each side of the stem.

1. SCIRPEARIA MIRABILIS.

B.M.

Scirpearia mirabilis, Cuvier, Schweiger, Beob. t. 2. f. 13.

Pennatula mirabilis, Pallas.

Polypus mirabilis, Linn. Mus. Adolph. t. 19. f. 4.

Funiculina cylindrica, Lamk. (not synonyms).

Pavonaria scirpea, Blainv.

St. Vincent's, West Indies.

See *Funiculina mediterranea*, Risso, Eur. Merid. v. 365.

Linnaeus figures the coral as free, and furnished with polypiferous cells the whole of its length and with attenuated ends. Schweiger figures the coral as free, with a thicker naked turned-up base, like *Pennatula*, with which he arranges it; but I am informed that in the Berlin Museum the specimen is attached to a rock by an ex-

panded base. The Museum specimen is only a fragment, like a Coral or Gorgonia; but the form of the cell, the bark, and the axis much more resembles that of a Coral or Gorgonia than any genus of *Pennatuladae*.

M. Valenciennes forms a genus *Gorgonella*, thus characterized:—"Sclerobase (axis) calcareous, much divided, forming fine branches," to which he refers *G. violacea* and *G. sarmentosa*, Lamk. I have not been able to find any specimens agreeing with these characters. The specimen in the Museum agreeing with Esper's figure of the latter species has a horny axis.

6. UMBRACELLA.

Coral flabellate, branched, branches subfurcate, flexuose often anastomosing. Axis smooth, polished, base white, coral-like; upper part rod-like, solid; branchlet white, flexible. Bark when dry granular, minutely punctate, thin, with a narrow continuous lateral groove. Polype cells in a rather irregular series on each side of the branchlets, rather prominent, roundish, white, with eight or ten radiating grooves from the apex, in two or three irregular interrupted series on each side of the main stem.

1. UM. UMBRACULUM.

Gorgonia umbraculum, Solander, Z. t. 10.

2. UM. GRANULATA.

B.M.

Gorgonia granulata, Esper, t. 4.

Suborder III. CERATOPHYTA.

Axis single, continued, horny (not effervescing in muriatic acid), having an expanded base, by which it is attached to some fixed marine body.

Fam. 1. ANTIPATHIDÆ.

Antipathidæ, Gray, Syn. B.M. 1842, 135.

Antipathacea, Dana, Zooph. 574.

Zoantharia cauliculata, Edw. & Haime, Arch. Mus. H. N. v. 175.

Bark fleshy, easily deciduous, soft, simple, only strengthened with large and small scattered (siliceous?) plates.

1. LEIOPATHES.

Leiopathes, Gray, Syn. B.M. 1842, 135.

Axis smooth, polished, branched, forked. Bark soft, deciduous, deliquescent, sometimes forming (when dry) smooth, transparent masses at the fork of the branchlets.

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1. LEIOPATHES GLABERRIMA.

B.M.

Leiopathes glaberrima, Gray, Proc. Comm. Sci. Zool. Soc. ii. 41.*Antipathes glaberrima*, Esper, ii. t. 9.? *Antipathes dichotoma*, Pallas, 216.

Marsilli, Lith. no. 9. t. 101. f. 21 ?

The Black coral of commerce.

Mediterranean; Malta.

Marsilli observed the coral covered with minute blotches on one side when he first obtained it.

2. LEIOPATHES BOSCHII.

"Stem flexible, branched; branches diverging, extremities setaceous."

Antipathes Boschii, Lamx. Pol. Flex. 375. t. 14. f. 5; Corallina, 191. t. 14. f. 5.

Carolina.

Lamaroux's figures represent the bark forming small masses between the branchlets, as I have observed it on the Madeira specimen.

Some of the smooth species referred to the genus *Antipathes* by Esper, as *A. fœniculacea*, t. 7; *A. clathrata*, Pallas, Esper, t. 2; *A. lingulata*, Esper, t. 5, are evidently the axes of some species of *Gorgoniadæ* that have lost their bark.

2. ANTIPATHES.

Antipathes, Gray, Syn. B.M. 1842.

Bark fleshy, with imbedded, large and small brown (siliceous) plates, easily deciduous. Axis simple or branched, horny, covered with numerous close small subcylindrical spines.

Mr. Dana observes,—“The examination of the animal of two species (*A. anguina* and *A. arborea*, t. 56. f. 1, 2), has led to an arrangement of them with *Actinoida*, as the tentacles have the naked character peculiar to this suborder, and the polypes closely resemble those of the *Madreporæ* in appearance and habit.”—Dana, p. 575.From the examination of the animal of *A. glaberrima* and *A. anguina*, I am led to the opposite conclusion that they are true zoophytes. I am aware that the tentacles do not appear pinnated when they are examined after they have been dried, but this is the case with the animals of all the *Gorgoniadæ* I have examined under similar conditions. The pinnæ appear to be permanently withdrawn under such circumstances.

* Coral simple, flexuous or spiral, unbranched. Cirripathes.

1. ANTIPATHES SPIRALIS, Pallas, P.Z.S. 1857, p. 113; Radiata, pl. 6. B.M.

Gorgonia spiralis, Linn. S. N. 1290.*Antipathes spiralis*, Ellis, Zooph. 99. t. 19. f. 1-6.Mollucca (*Ellis*).

2. ANTIPATHES ANGUINA.

B.M.

Antipathes anguina, Dana, l. c. 576. t. 56. f. 1.*Cirripathes Sieboldii*, Blainv.

Feejee Islands.

3. ANTIPATHES GRACILIS.

B.M.

Slender, tapering, slightly spinose.

Madeira (*Mason*).** *Coral branched.*

4. ANTIPATHES FURCATA.

B.M.

Antipathes furcata, Seba, iii. t. 107. f. 4.

Coral shrub-like, branched, repeatedly forked; branches slender, elongate, filiform; stem slender, short, smooth.

Madeira (*Mr. Mason*, 1857).

5. ANTIPATHES FRUTICOSA.

B.M.

Coral shrub-like, very branchy; branchlets linear, elongate, with a few distant elongate branches, sometimes in a single row coming from the same side of the branchlet; spinules rather far apart.

Stephens Island (*J. B. Jukes*).

6. ANTIPATHES PLUMA.

B.M.

Coral fan-like, branched, forked; branchlets pinnate, simple, in two opposite diverging series; spinules very close, crowded.

Hab. — ?

7. ANTIPATHES PEDATA.

B.M.

Coral fan-like, on one plane, branched; branchlets linear, elongate, in one series on the upper side of the arched branches, and branched on the inner side.

West Indies (*Scrivener*).

8. ANTIPATHES RETICULATA.

B.M.

Antipathes reticulata, Esper, i. 183. t. 11.

Coral fan-shaped in one plane, branches slender; branchlets very slender, subpinnate, irregularly disposed, often anastomosing, forming a suborbicular frond.

West Indies (*Scrivener*).

9. ANTIPATHES ATLANTICA.

B.M.

Coral shrub-like, branched, branches fan-like, irregularly pinnate; branchlets elongate, with distant subulate pinnae, the larger one sometimes pinnated, the branches and branchlets often anastomosing.

West Indies (*Scrivener*).

10. ANTIPATHES ULEX.

B.M.

Antipathes ulex, Soland. Zooph. 100. t. 19. f. 7, 8; Lamx. Exp. t. 19. f. 7, 8

Antipathes mimosella, Lamk. no. 8.

Coral shrub-like, branches rather fan-like; branchlets slender, rather distant, in two rows, diverging from the side of the upper surface of the branches.

Batavia (*Ellis*); Philippines (*Cuming*).

11. ANTIPATHES MYRIOPHYLLUM.

B.M.

Antipathes myriophyllum, Soland. Zooph. 102. t. 19. f. 11, 12; Lamx. Exp. t. 19. f. 11, 12; Esper, t. 10; Blainv. Man. t. 87. f. 2. *A. pinnatifida*, Lamx. Pol. Flex. 277. t. 14. f. 4?. Coral. t. 14. f. 4?.

Coral shrub-like, branched, branches rather fan-like in one plane; branchlets short, crowded, subpinnate, in two rows, diverging from the sides of the upper surface of the branches, which are smooth and subangular beneath.

Batavia (*Ellis*); Philippines (*Cuming*).

Antipathes compressa, Esper, t. xiii., greatly resembles the base of the stems of this species.

12. ANTIPATHES LARIX.

B.M.

Antipathes larix, Esper, ii. 147. t. 4.

Coral cylindrical, simple, erect; stem subtriangular below, cylindrical above; branches numerous, crowded on all sides of the stem, simple, hair-like, elongate.

Mediterranean (*Lamk.*).

In collections the branches are often broken off by pressure, and it then appears as if there were only two rows, one on each side of the stem, as figured by Esper: but the base of the branches is generally to be observed.

13. ANTIPATHES ABIES.

B.M.

Gorgonia abies, Linn. S. N. 1290.

Antipathes cupressus, Soland. Z. 103.

Antipathes cupressina, Pallas, Z. 213; Esper, t. 3, bad.

Cyprinus marinus, Rumph. Amb. vi. t. 80. f. 2; Seba, iii. t. 106. f. 1.

Coral cylindrical, oblong or subfusiform; stem simple, rarely with one or two branches; branchlets spreading on all sides, repeatedly divided and arched downwards.

Philippines (*Cuming*).

14. ANTIPATHES SPINESCENS.

B.M.

Coral branched, branches divaricating, subcylindrical; branchlets on all sides of the stem crowded, short, of nearly equal length,

straight, spine-like, with spine-like branches and branchlets on their sides; the lower branchlet sometimes tending toward one surface.

Cape Palmas (*Hooker*).

15. ANTIPATHES HIRTA.

B.M.

Coral branched, branches divaricated; branchlets from all sides of the stem, crowded and generally bent up toward one surface, elongate, nearly of a uniform length, simple, with a few filiform, generally short branches on their base.

West Indies (*Scrivener*).

16. ANTIPATHES SUBPINNATA.

B.M.

Antipathes subpinnata, Soland. Z. 101. t. 19. f. 9, 10.

Coral erect, irregularly branched, branches diverging; branchlets close together in three (rarely two or four) longitudinal series on the different sides of the stem, elongate, slender, ascending, simple, and of nearly equal length.

Madeira (*Wollaston*).

Solander's figure but imperfectly represents this species, if it is intended for it. I had originally described it as distinct under the name of *A. Wollastonii*.

The following species have been described, which I have not seen:—

1. ANTIPATHES PECTINATA.

Antipathes pectinata, Lamk. ii. 480. no. 6.

2. ANTIPATHES PINNACEA.

Antipathes pinnacea, Pallas, iii. 269.

3. ANTIPATHES SCOPARIA.

Antipathes scoparia, Esper, t. 14; Lamk. 480. no. 7.

4. ANTIPATHES FÆNICULACEA.

Antipathes fœniculacea, Pallas, Z. 207; Rumph. Amb. vi. 208. t. 80. f. 3, not Esper.

Antipathes fœniculum, Lamk. 482. no. 12.

5. ANTIPATHES CORTICULA.

Antipathes corticula, Lamk. ii. 480. no. 3.

"The bark" appears to be a parasitic animal.

6. ANTIPATHES LACERATA.

Antipathes lacerata, Lamk. ii. 480. no. 4.

A. lacera, Lamx. Pol. Flex. 277.

7. ANTIPATHES PYRAMIDATA.

Antipathes pyramidata, Lamk. ii. 480. no. 5.

8. ANTIPATHES ALOPECUROIDES.

Antipathes alopecuroides, Soland. Zooph. 102.
S. Carolina.

9. ANTIPATHES PANICULATA.

Antipathes paniculata, Esper, t. 12.

10. ANTIPATHES ARBOREA.

Antipathes arborea, Dana, Zooph. 585. t. 56. f. 2.
Feejee Islands.

11. ANTIPATHES FLABELLUM.

Antipathes flabellum, Pallas (not Esper), t. 1.

12. ANTIPATHES ERICOIDES.

Antipathes ericoides, Pallas, Z. 208 ; Esper, t. 6.

13. ANTIPATHES TRIQUETRA.

Antipathes triquetra, Brug. E. M. 82.

3. SARCOGORGIA.

Sarcogorgia, Gray, P. Z. S. 1857, p. 158.

Bark fleshy, then when dry like a thin smooth skin without spicula, with rather raised cells strengthened with sand-like granular spicula. Coral furcately branched on a single plane. Axis black, hard, smooth.

1. SARCOGORGIA PHIDIPPUS.

Sarcogorgia phidippus, Gray, P. Z. S. 1857, p. 158. pl. 8.

(To be continued.)

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The names of New Species, and of Species newly characterized, are printed in Roman Characters; those of Species previously known, but respecting which novel information is given, in *Italics*; those of Species respecting which Anatomical Observations are made, in CAPITALS.

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